Final

2015 Urban Water Management Plan

for the

Southern Division – San Diego County District

Prepared for:

CALIFORNIA
AMERICAN WATER

Prepared by:

WSC
WATER SYSTEMS CONSULTING, INC.

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LIST OF ACRONYMS, TERMS & ABBREVIATIONS

Acronym, Term or Abbreviation	Definition
afy	acre feet per year
AWWA	American Water Works Association
BMP	Best Management Practice
HCF	Hundred Cubic Feet
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Information System
CPS	Comprehensive Planning Study
CPUC	California Public Utilities Commission
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
DDW	California Division of Drinking Water
District	California American Water - Ventura County District
DMM	Demand Management Measure
DWR	California Department of Water Resources
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ETo	Evapotranspiration
GHG	Greenhouse Gas
GIS	Geographic Information Systems
gpcd HECW	gallons per capita per day High Efficiency Clothes Washer
HET	High Efficiency Toilets
HEU	High Efficiency Urinals
IOU	Investor Owned Utility
IRWMP	Integrated Regional Water Management Plan
kWh	kilowatt-hour
LL	Large Landscape
LRWRP	Long-Range Water Resources Plan
MCB	Marine Corps Base
MG	Million Gallons

Acronym, Term or Abbreviation	Definition
MGRA	Master Geographic Area
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
MWWD	City of San Diego's Metropolitan Wastewater Department
NRW PV	Non-Revenue Water Photovoltaic
OSR	On-site water recycling
PWS	Public Water System
RWMP	Recycled Water Master Plan
SANDAG	San Diego Association of Governments
SB7	Senate Bill x 7-7
SB7 Guidebook	the California Department of Water Resources' *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*
SBWRP	South Bay Water Reclamation Plant
SCAG	Southern California Association of Governments
SDCWA	San Diego County Water Authority's
SWP	State Water Project
TDS	total dissolved solids
TTHM	Total Trihalomethane
ULFT	Ultra Low Flow Toilets
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
UWMP Guidebook	the California Department of Water Resources' *Guidebook to Assist Water Suppliers in the Preparation of a 2015 Urban Water Management Plan*
WBIC	Weather Based Irrigation Controllers
WD	Water District
WRAM	Water Revenue Accounting Mechanism
WSA	Water Supply Assessment
WSS	Water Sense Specifications

1 INTRODUCTION AND OVERVIEW

This plan comprises the 2015 Urban Water Management Plan (UWMP) for California-American Water Company's (California American Water's) Southern Division - San Diego County District (District), as required by the California Urban Water Management Planning Act (UWMP Act). The UWMP Act requires all urban water suppliers with more than 3,000 connections or distributing more than 3,000 acre feet per year (afy) to complete an UWMP every five years ending in '5' and '0'. The UWMP Act is administered by the California Department of Water Resources (DWR), who is responsible for compiling data for statewide and regional analysis, and publishing the accepted documents online for public access.

The UWMP is a valuable planning document used for multiple purposes:

- Serves as a valuable resource to the community and other interested parties regarding water supply and demand, conservation and water related information
- Meets a statutory requirement of the California Water Code
- Provides a key source of information for Water Supply Assessments (WSAs) and Written Verifications of Water Supply
- Supports regional long-range planning documents including City and County General Plans
- Provides a standardized methodology for water utilities to assess their water resource needs and availability
- Serves as a critical component in developing Integrated Regional Water Management Plans (IRWMPs)
- Provides a resource for regional involvement in the California Water Plan

California American Water is a privately owned public utility providing water services to over 630,000 people in 50 communities throughout California. California American Water is organized into three divisions: Northern, Central and Southern. The Northern Division includes the Sacramento and Larkfield Districts, the Central Division includes the Monterey District, and the Southern Division includes the Ventura County, Los Angeles County and San Diego County Districts.

The San Diego County District (District) in California American Water's Southern Division is a single service area exceeding the 3,000 afy/3,000 connections threshold. California American Water has prepared and submitted to DWR four (4) previous UWMPs for the San Diego County District: 1995-2000; 2000-2005; 2006-2010; and 2010. The District was previously titled the Coronado District; thus, the previous UWMPs were designated for the Coronado District. California American Water has since changed the name of the District to the San Diego County District. The service area boundaries have remained the same.

2 PLAN PREPARATION

This plan was prepared based on guidance from DWR's *Guidebook to Assist Water Suppliers in the Preparation of a 2015 Urban Water Management Plan* (UWMP Guidebook) (1), DWR Urban Water Management Plans Public Workshops and Webinars, *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (SB7 Guidebook) (2), and the 2015 DWR Checklist (Appendix D).

The 2015 UWMPs are to be submitted by urban water suppliers by July 1, 2016. Previously, UWMPs have been due on December 31 of years ending in '0' and '5', but an extension has been granted for submittal of the 2015 UWMPs to provide additional time for water suppliers to demonstrate compliance with their established water use target for the year 2015 per Senate Bill x 7-7 (SB7) requirements. The Draft 2015 UWMP Guidebook became available in November 2015. DWR's 2015 UWMP schedule is summarized in Table 2-1.

Table 2-1. Preliminary Schedule for DWR's 2015 UWMP Guidebook Update

Date	Event/Task
November 2015	Draft Guidebook released
December 2015	Workshops
January 2016	Amended Final Guidebook and appendices released
July 1, 2016	UWMPs due to DWR

A DWR checklist is provided in Appendix D. Table 2-2 summarizes changes to the UWMP Act since 2010 that have been addressed in this UWMP.

Table 2-2. Summary of Changes in the UWMP Act Since 2010

Change	CWC Section	Legislative Bill	Summary
Demand Management Measures	10631 (f)(1) and (2)	AB 2067, 2014	Requires water suppliers to provide narratives describing their water demand management measures, as provided. Requires retail water suppliers to address the nature and extent of each water demand management measure implemented over the past 5 years and describe the water demand management measures that the supplier plans to implement to achieve its water use targets.
Submittal Date	10621 (d)	AB 2067, 2014	Requires each urban water supplier to submit its 2015 plan to the Department of Water Resources by July 1, 2016.
Electronic Submittal	10644 (a) (2)	SB 1420, 2014	Requires the plan, or amendments to the plan, to include any standardized forms, tables, or displays specified by the department.
Standardized Forms	10644 (a) (2)	SB 1420, 2014	Requires the plan, or amendments to the plan, to include any standardized forms, tables, or displays specified by the department.

Change	CWC Section	Legislative Bill	Summary
Water Loss	10631 (e) (1) (J) and (e) (3) (A) and (B)	SB 1420, 2014	Requires a plan to quantify and report on distribution system water loss.
Estimating Future Water Savings	10631 (e) (4)	SB 1420, 2014	Provides for water use projections to display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans, when that information is available and applicable to an urban water supplier.
Voluntary Reporting of Energy Intensity	10631.2 (a) and (b)	SB 1036, 2014	Provides for an urban water supplier to include certain energy related information, including, but not limited to, an estimate of the amount of energy used to extract or divert water supplies.
Defining Water Features	10632	AB 2409, 2010	Requires urban water suppliers to analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.

2.1 COORDINATION

California American Water coordinated with multiple neighboring and stakeholder agencies in the preparation of this UWMP. The coordination efforts were conducted to: 1) inform the agencies of California American Water activities; 2) gather high quality data for use in developing this UWMP; and 3) coordinate planning activities with other related regional plans and initiatives. The coordination activities conducted by California American Water are summarized in Table 2-3.

Table 2-3. Agency Coordination

Agency / Organization	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Was sent a copy of the final plan
The City of Coronado						X	
The City of Imperial Beach						X	
The City of Chula Vista						X	
The City of San Diego						X	
The County of San Diego						X	

2.2 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

To fulfill the requirements of Water Code Section 10621(c), California American Water sent letters of notification of preparation of the 2015 UWMP to all cities and counties within its San Diego County District service areas 60 days prior to the public hearing. Copies of the 60-day notification letters are attached as Appendix G.

To fulfill the requirements of Water Code Section 10642 of the UWMP Act, California American Water made the draft 2015 UWMP available for public review and held a public hearing on June 24, 2016. The public review hearing was noticed in the San Diego Union-Tribune on June 10, 2016; the hearing notice is attached in Appendix C. California American Water sent letters of notification of the public hearing, with a link to download the draft UWMP, to the cities, counties, and wholesale agencies listed in Table 2-3 above; copies of the letters are included in Appendix C. In addition, California American Water has maintained a copy of the draft UWMP in its office since June 7, 2016 and has had an electronic copy of the draft posted on the company's public website prior to the public hearing.

The Final 2015 Southern Division San Diego County District UWMP was formally adopted by California American Water on June 30, 2016. A copy of the Adoption Resolution is included in Appendix F. A copy of the Final 2015 Southern Division San Diego County District UWMP was sent to the California State Library, DWR (electronically using the WUEdata reporting tool), and all cities and counties within California American Water's San Diego County District service area. California American Water made the final 2015 UWMP available for public review on its website and in its office during normal hours.

2.2.1 Implementation of the 2015 UWMP

The implementation of this plan shall be carried out as described unless significant changes occur between the adoption of this plan and the 2020 plan. If such significant changes do occur, California American Water will amend and readopt the plan as required by the California Water Code. For more information on implementation of specific sections of this plan, see Sections 2.2.2 and 2.2.3.

2.2.2 Implementation of the Recycled Water Plan

California American Water does not currently receive recycled water and does not distribute recycled water within its San Diego County District. In 2015, the District contracted with an engineering firm to assess the potential of providing recycled water to existing customers within the Coronado and Imperial Beach service areas. This proposed capital investment project includes the delivery of recycled water for landscaping for existing customers such as parks, schools, city landscaping, and golf courses. This is discussed in more detail in Section 5.6.3.

2.2.3 Implementation of the Demand Management Measures

California American Water is a member of the California Urban Water Conservation Council (CUWCC) and is a signatory to the CUWCC Memorandum of Understanding (CUWCC MOU). The CUWCC MOU outlines 14 Best Management Practices (BMPs) that correspond with the Demand Management Measures (DMM) outlined in the UWMP Act. The UWMP Act allows CUWCC members to submit their CUWCC BMP reports in lieu of completing a DMM section if the member is in full compliance with the BMPs. The District is a CUWCC member and in full compliance with the CUWCC requirements. This plan contains a DMM section (see Section 7) and the BMP report was not available at the time this UWMP was prepared.

The evaluation of BMPs provides guidance for internal development of California American Water's conservation programs and is used as testimony and support documentation for rate cases required by the CPUC. The BMPs listed in the 2010 UWMP are being implemented as planned or exceed the planned implementation. The implementation of any of the described programs and costs are contingent on the CPUC approval of programs and their budget funding, as well as incorporation in the American Water Business Plan.

3 SYSTEM DESCRIPTION

California American Water is a privately owned public utility providing water services to over 630,000 people in 50 communities throughout California. California American Water is a wholly-owned subsidiary of the American Water Works Company (American Water), one of the largest investor-owned water and wastewater utility companies in the United States. American Water is headquartered in Voorhees, New Jersey, and California American Water is headquartered in Coronado, CA. The Coronado office will be relocating to San Diego mid-July 2016. California American Water was incorporated into American Water under California law in 1966 when American Water acquired California Water and Telephone.

California American Water is operated by three Division Offices: Northern Division; Central Division; and Southern Division. The Southern Division includes the San Diego County District, the Los Angeles County District, and the Ventura County District. Each district within the Southern Division has a separate UWMP. This UWMP covers the San Diego County District.

California American Water is an investor owned utility (IOU) regulated by the California Public Utility Commission (CPUC), CPUC Utility #U210W. Therefore, its facilities, operations and financial structure (including customer rates) are subject to extensive regulation by the CPUC, as well as environmental, health, safety and water quality regulations by federal, state and local governments. The CPUC sets rules and regulations that govern public utility companies in California. The intent of the regulations set by the CPUC is to ensure provision of high quality water service at a fair price. All increases in service rates are directly related to the cost of providing quality service and are subjected to a public review process and approval by the CPUC.

The District contains one Public Water System (PWS): CA3710001. PWSs are the systems that provide drinking water for human consumption. These systems are regulated by the State Water Resources Control Board (SWRCB), Division of Drinking Water (DDW).

3.1 SERVICE AREA DESCRIPTION AND BOUNDARY MAPS

California American Water's San Diego County District serves the City of Coronado (excluding the North Island Naval Air Station), the City of Imperial Beach, a section of the City of San Diego located south of San Diego Bay, and a small portion of the City of Chula Vista, as shown in Figure 3-1. All areas served are in the southern part of San Diego County, California. The District encompasses approximately 11,962 acres and is topographically flat and highly urbanized. The areas served are accessed by Interstate Highways 5 and 805. The Coronado peninsula is accessed by the San Diego-Coronado Bay Bridge or by Route 75 (also known as the Silver Strand).

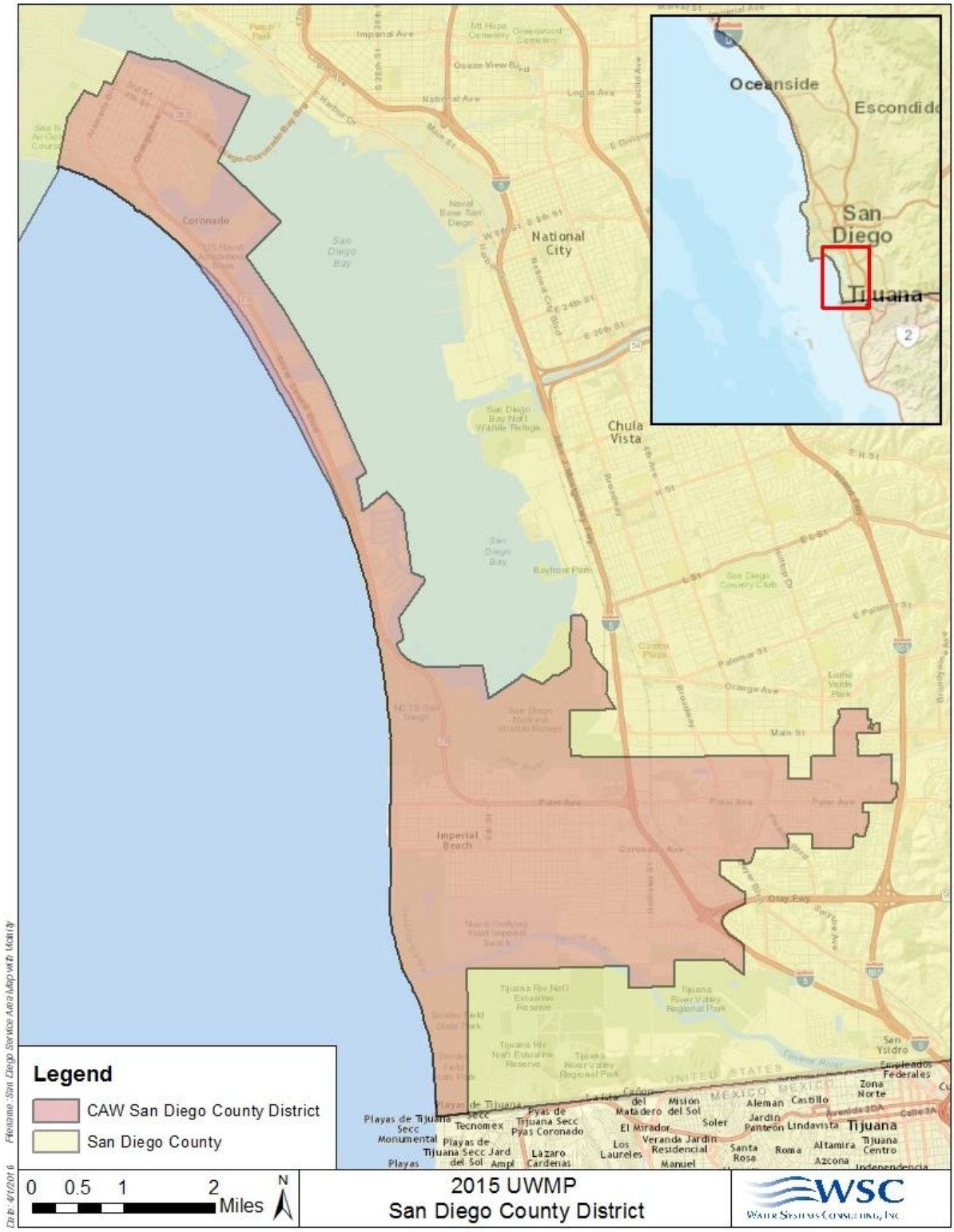

Figure 3-1. San Diego County District

3.2 SERVICE AREA CLIMATE

The climate of the San Diego County District is characterized as semi-arid Mediterranean with warm summers and mild winters. The Pacific Ocean borders the District on the west; thus, the District's climate is largely influenced by the Pacific Ocean, which results in small daily and seasonal temperature ranges. The Western Regional Climate Center maintains a weather station in Chula Vista, which gives data representative of the area. The average annual temperature in Chula Vista is 61°F. The warmest months of the year are July through September, with an average temperature of 68.3°F for the three-month period. The coolest months of the year are December through February, with an average temperature of 54.6°F.

The average annual precipitation in Chula Vista is 9.73 inches per year, almost all of which is in the form of rainfall. About 89% of the rainfall occurs from November through April.

The evapotranspiration rate is highest in July and August and lowest in December and January. Detailed average monthly precipitation, temperature and evapotranspiration data for Chula Vista can be found in Table 3-1 and Table 3-2.

Table 3-1. Average Precipitation, Temperature and Evapotranspiration between January and June in Chula Vista

Climate Parameter	January	February	March	April	May	June
Average Rainfall, in[1]	1.76	1.92	1.61	0.82	0.21	0.05
Average Temperature, °F[1]	54.0	55.1	56.5	58.7	61.6	64.0
Average ETo, in[2]	2.31	2.63	3.82	4.44	4.94	5.1

[1]Data derived from Western Regional Climate Center, Station:(041758) Chula Vista 1918-2015, http://www.wrcc.dri.edu/CLIMATEDATA.html

[2]Data derived from California Irrigation Management Information System (CIMIS), Monthly Average ETo Report, Station 184 (San Diego II), 2005-2015, http://wwwcimis.water.ca.gov/cimis/data.jsp

Table 3-2. Average Precipitation, Temperature, and Evapotranspiration between July and December in Chula Vista

Climate Parameter	July	August	September	October	November	December	Annual
Average Rainfall, in[1]	0.02	0.06	0.16	0.51	0.98	1.63	9.73
Average Temperature, °F[1]	67.8	69.2	67.8	63.7	58.7	54.8	61.0
Average ETo, in[2]	5.36	5.20	4.53	3.45	2.43	1.89	46.10

[1]Data derived from Western Regional Climate Center, Station:(041758) Chula Vista 1918-2015, http://www.wrcc.dri.edu/CLIMATEDATA.html

[2]Data derived from California Irrigation Management Information System (CIMIS), Monthly Average ETo Report, Station 184 (San Diego II), 2005-2015, http://wwwcimis.water.ca.gov/cimis/data.jsp

The weather data for Chula Vista describes the climate of the area being served, but not the climate of where the water supply for the District originates. All of the San Diego County District's water supply is purchased from the City of San Diego, and thus the reliability of their supply directly impacts the reliability of the San Diego County District's supply. The discussion of the dry year and multiple dry year scenarios are aligned with those of the City of San Diego and are discussed in Section 6.

3.3 SERVICE AREA POPULATION AND DEMOGRAPHICS

The population served by the Southern Division's San Diego County District was estimated to be 94,043 in 2015, which reflects a general decreasing population trend since 2000 as shown in Table 3-4. The areas served are largely built out; hence any population growth is expected to be slow. Most growth is expected to come from redevelopment and construction of higher occupancy housing, such as apartments or townhomes, and a reduction in vacancy of existing units (3). Using data from the San Diego Association of Governments (SANDAG), the annual population growth for the San Diego County District is projected to remain under 1% through 2035, as shown in Table 3-3 (4).

Table 3-3. San Diego County District Projected Growth Rates

	2016-2020	2021-2025	2026-2030	2031-2035
Annual Compound Growth Rates[1]	0.26%	0.61%	0.61%	0.61%
[1] Growth rates were calculated from SANDAG population projection data.				
Source: San Diego Association of Governments (4)				

Table 3-4 and Figure 3-2 show the past, current, and projected future population of the San Diego County District. The population figures for 2000, 2010 and 2015 were calculated using the DWR Population Tool. For years after 2015, population was estimated using the growth rates from SANDAG's population projections. Appendix E provides additional detail regarding the methodology used to establish population projections.

Table 3-4. Population- Past, Current, and Projected[1]

	2005	2010	2015	2020	2025	2030	2035
San Diego County District	96,368	95,359	94,043	95,289	98,223	101,246	104,363
[1] The population projections for California American Water's service area is based on 2010 census data, DWR's Population Tool, and growth rates from the SANDAG 2013 Growth Forecast adjusted for the District's service area.							

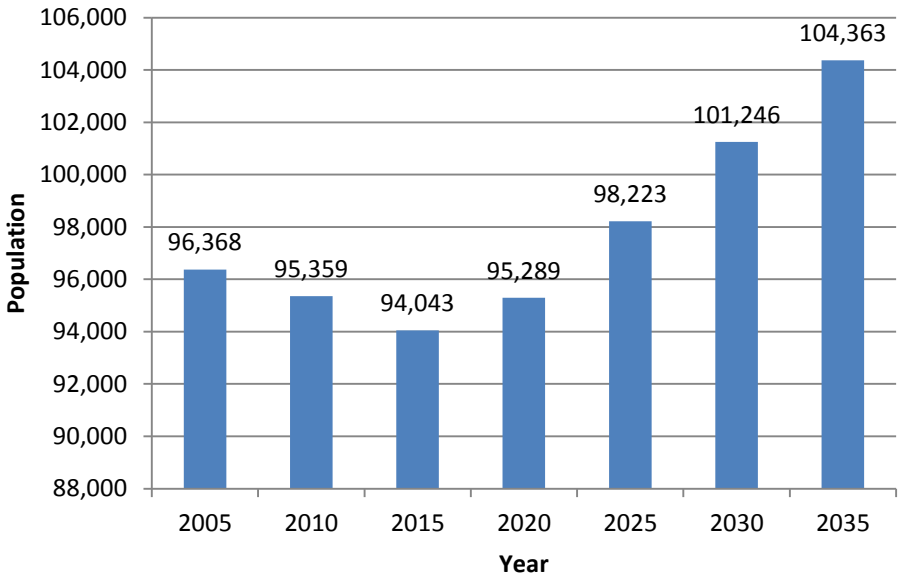

Figure 3-2. Historical, Current, and Projected Population of the San Diego County District

4 SYSTEM DEMANDS

Demand projections incorporate ongoing and future water conservation efforts to reflect a reduced per capita usage as required by SB7. Appendix A describes the methodology used to develop the SB7 baseline and targets in detail. The methodology for developing demand projections is included in Appendix E.

4.1 BASELINE AND TARGETS

The calculation of SB7 baseline and target per capita water use is discussed in detail in Appendix A. Table 4-1 shows the baseline, 2015 actual use (compliance), interim target, and target per capita water use for the San Diego County District.

Table 4-1. Baseline, Compliance, Interim Target, and Target Per Capita Water Use (Appendix A)

Parameter	Water Use (gpcd)
Baseline Daily Per Capita Water Use	121
2015 Actual Daily Per Capita Water Use	89
2015 Interim Urban Water Use Target	118
2020 Urban Water Use Target	116

As seen in Table 4-1, the District's per capita water use in 2015 was significantly below the District's calculated 2015 interim target and 2020 target. The steady decline in per capita water use from 2006 through 2010 is attributed to a combination of factors such as economic conditions, prolonged drought conditions, and State mandated conservation regulations. It is assumed that these factors have resulted in subsequent physical (e.g., turf replacement, water fixture replacement, etc.) and behavioral changes (e.g., irrigating less or quicker showers due to various media conservation campaigns and materials) in customer demand patterns associated with effective conservation programs. While physical conservation related changes result in essentially permanent demand reductions, behavioral changes may not yield permanent demand reductions. State mandated emergency water conservation regulations may have a short-term impact on demand reductions during drought conditions, but it is assumed that there will be a rebound to average demands due to customers' behavioral changes over the long-term. By nature, the State mandated emergency regulations are temporary, but SB7 requirements are long-term. The City of San Diego implemented a Level 2 Drought Alert with mandatory water use restrictions in July 2015 (5). Mandatory water restrictions by the City of San Diego affect water use in the District and likely played a role in the low water use recorded in the District from 2012 to 2015. For the purposes of projecting District-wide water use, the per capita water use between 2015 and 2020 was linearly interpolated to meet the 2020 target. Figure 4-1 displays the baseline and targets as well as historical and projected per capita water use.

Based on Governor Brown's Executive Order B-37-16, revised baselines, targets and/or water use reduction methodologies could be required in 2017. The State Water Resource Control Board, DWR, CPUC and the California Energy Commission will be developing an action plan to implement the Executive Order during 2016. It is anticipated that the implementation of the action plan will require legislative action to enact any new requirements. Depending on the outcome of the process, the District will respond accordingly to make any adjustments necessary to meet new requirements.

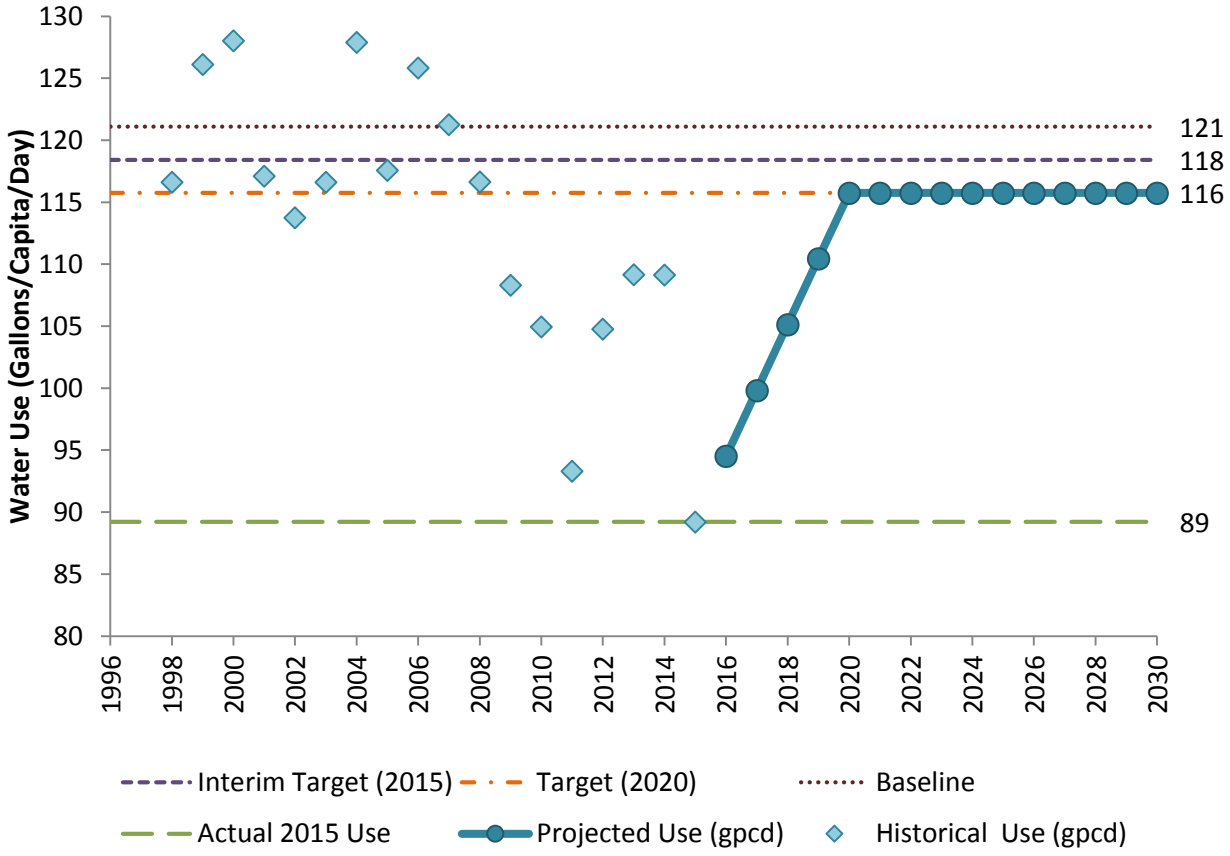

Figure 4-1. Per Capita Water Use - Historical, Projected, Baseline and Targets

4.2 WATER DEMANDS

The following tables (Table 4-2 through Table 4-6) show the past, current, and projected demands. The methodology for demand projections is outlined in Appendix E. Figure 4-2 shows the past, current, and projected water deliveries for the District. The District's billing system changed in 2013, so the water use sectors are different for 2010 compared with 2015-2035. The new billing system breaks down water use into eight sectors as follows: Residential, Commercial, Industrial, Fire, OPA, Co Acct., Resale, and Miscellaneous. Residential encompasses both single- and multi-family residential water use. Fire includes both fire hydrants and fire services. OPA, which stands for "other public authority," includes government accounts and schools. Co Account represents the California American Water company account. The resale sector includes sales to other agencies while the miscellaneous sector primarily consists of construction meter usage.

Table 4-2. San Diego County District Deliveries 2010

	2010[1]				
	Metered		Not Metered		Total
Water use sectors	# of Connections	Volume (afy)	# of Connections	Volume (afy)	Volume (afy)
Single family	18,138	5,179	0	0	5,179
Multi-family	1,339	2,549	0	0	2,549
Commercial	609	952	0	0	952
Industrial	0	0	0	0	0
Institutional/ governmental	207	1,091	0	0	1,091
Landscape	386	963	0	0	963
Agriculture	0	0	0	0	0
Other[2]	223	3	0	0	3
Total	**20,903**	**10,737**	**0**	**0**	**10,737**

[1] 2010 connections and delivery data were derived from the 2010 California American Water customer database and the 2010 California American Water Operating Report.
[2] Other includes private fire connections and seasonal connections.

Table 4-3. San Diego County District Deliveries 2015

	2015[1]				
	Metered		Not Metered		Total
Water use sectors	# of Connections	Volume (afy)	# of Connections	Volume (afy)	Volume (afy)
Residential	18,289	4,320	0	0	4,320
Commercial	2,062	3,657	0	0	3,657
Industrial	0	0	0	0	0
Fire	470	30	0	0	30
OPA	321	1,237	0	0	1,237
Co Acct	1	0	0	0	0
Resale	0	0	0	0	0
Misc	13	55	0	0	55
Total	**21,156**	**9,298**	**0**	**0**	**9,298**

[1] 2015 connections and delivery data were derived from the 2015 California American Water customer database and the 2015 California American Water Operating Report.

Table 4-4. San Diego County District Projected Deliveries 2020

	2020				
	Metered		Not Metered		Total
Water use sectors	# of Connections	Volume (afy)	# of Connections	Volume (afy)	Volume (afy)
Residential	18,531	5,561	0	0	5,561
Commercial	2,089	4,708	0	0	4,708
Industrial	0	0	0	0	0
Fire	476	39	0	0	39
OPA	325	1,592	0	0	1,592
Co Acct	1	0	0	0	0
Resale	0	0	0	0	0
Misc	13	70	0	0	70
Total	**21,436**	**11,971**	**0**	**0**	**11,971**

Table 4-5. San Diego County District Projected Deliveries 2025

	2025				
	Metered		Not Metered		Total
Water use sectors	# of Connections	Volume (afy)	# of Connections	Volume (afy)	Volume (afy)
Residential	19,102	5,733	0	0	5,733
Commercial	2,154	4,853	0	0	4,853
Industrial	0	0	0	0	0
Fire	491	40	0	0	40
OPA	335	1,641	0	0	1,641
Co Acct	1	0	0	0	0
Resale	0	0	0	0	0
Misc	14	73	0	0	73
Total	**22,096**	**12,339**	**0**	**0**	**12,339**

Table 4-6. San Diego County District Projected Deliveries 2030 & 2035

	2030		2035	
	Metered		Metered	
Water use sectors	# of Connections	Volume (afy)	# of Connections	Volume (afy)
Residential	19,690	5,909	20,296	6,091
Commercial	2,220	5,002	2,288	5,156
Industrial	0	0	0	0
Fire	506	41	522	42
OPA	346	1,692	356	1,744
Co Acct	1	0	1	0
Resale	0	0	0	0
Misc	14	75	14	77
Total	**22,776**	**12,719**	**23,478**	**13,111**

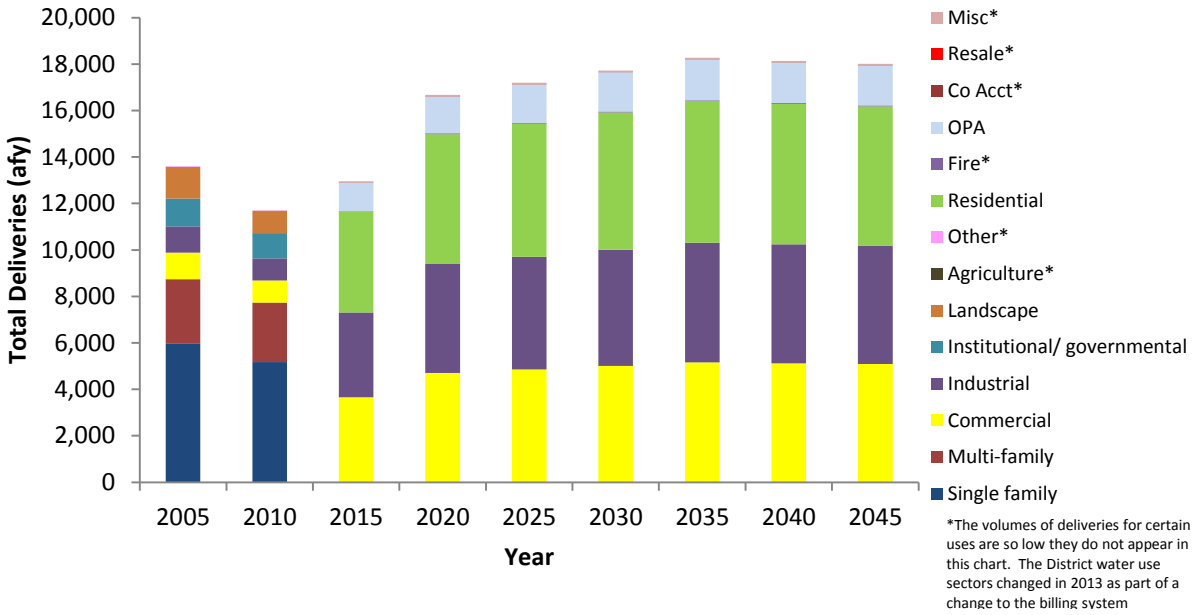

Figure 4-2. Past, Current, and Projected Deliveries

4.2.1 Low-Income Demands

Changes to the California Water Code section 10631.1 since 2005 require demand projections to include projected water use for single-family and multi-family residential housing needed for lower income households. Low-income households are defined as households making less than 80% of median statewide household income. SANDAG has been notified by the California Department of Housing and Community Development that 64,150 new low income units will be needed in San Diego County from January 1, 2010, through December 31, 2020 (11 years) (6). The percentage of various cities' total areas that are served by California American Water were applied to the cities' total number of projected units to determine the number of those that will be served by California American Water. Based on this analysis, approximately 1,009 new low-income units will be needed in California American Water's service area from 2010 through 2020, which is equivalent to 92 new low-income units annually.

Once the number of projected low-income units was established, the number of single-family and multi-family units was calculated by applying the percentage of existing single-family and multi-family residential connections within the San Diego County District. The amount of water used per connection was estimated based on historical connection and delivery data for 2010 (shown in Table 4-3) and projected connection and delivery data for years after 2010 (shown in Table 4-4 through Table 4-6). Linear interpolation was used to estimate the amount of water per connection for years not ending in 0 or 5. Table 4-7 shows the portion of the total demand that is assumed to be for new low-income households. All demand for low-income households is included in the total demand projections presented previously.

Table 4-7. San Diego County District Water Demands for New Low-Income Households for 2015-2020

Low-income Water Demands	2015	2016	2017	2018	2019	2020
Residential (afy)	49	50	50	50	51	51
Incremental Total (afy)[1]	**49**	**50**	**50**	**50**	**51**	**51**
Cumulative Total (afy)[2]	**338**	**388**	**438**	**489**	**541**	**338**

[1] Low-income demand added each year due to new low-income units.
[2] Cumulative total low-income demand for new low-income units added since 2010.

4.2.2 Sales to Other Water Agencies

Although California American Water has an emergency connection to the North Island Naval Air Station, California American Water does not have any contracts to sell water to other agencies as a wholesaler. Additionally, California American Water does not plan to sell water to other agencies in the future. Table 4-8 shows the historical, current, and projected amounts of water provided to other agencies.

Table 4-8. San Diego County District Sales to Other Water Agencies

Water distributed	2010	2015	2020	2025	2030	2035
N/A (afy)	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**

4.2.3 Additional Water Uses and Losses

Table 4-9 shows the current and projected amount of non-revenue water (NRW) for the San Diego County District. NRW is defined as system water losses (leaks, etc.) plus authorized unbilled (metered and unmetered) water consumption (7). In the San Diego County District, there is authorized unbilled unmetered consumption. For the purposes of this plan, NRW is set as the difference between the amount of water the District purchases from the City of San Diego and the amount of billed customer deliveries in the District.

The District began using the American Water Works Association (AWWA) Free Water Audit Software in 2010 to perform NRW audits for the District. NRW audits have been completed using the software through 2014.

For the year 2015, actual data was used from the District's operating reports. Based on the District's operating report for 2015, the District had approximately 99 afy of NRW which is significantly lower than average. It was discovered that District master meters measuring water from the City of San Diego were in need of calibration and under-registering during 2015. This situation has been remedied. In order to project future NRW to 2035, the average NRW from 2010 to 2015, or 3.1% of total purchases, was used. Table 4-9 shows the NRW for the San Diego County District.

Table 4-9. San Diego County District Non-Revenue Water

Water use	2015	2020	2025	2030	2035
Non-revenue water (NRW) (afy)	99	384	396	408	421
Total	**99**	**384**	**396**	**408**	**421**

4.2.4 Total Water Use

Table 4-10 shows the current and projected total water use for the San Diego County District. Total water use includes water delivered to customers, water sold to other agencies, and NRW.

Table 4-10. Total Water Use

Water Use	2015	2020	2025	2030	2035
Total water deliveries (afy)	9,298	11,971	12,339	12,719	13,111
Sales to other water agencies (afy)	0	0	0	0	0
Non-revenue water (NRW) (afy)	99	384	396	408	421
Total	**9,397**	**12,355**	**12,735**	**13,127**	**13,531**

4.3 WHOLESALE WATER DEMAND

California American Water's San Diego County District purchases all of its water from the City of San Diego. Table 4-11 shows the amount of water projected to be purchased from the City of San Diego, provided that the full supply from the City is available per the requirements of the contract. The District provided the City with the District's wholesale demand projections.

Table 4-11. Demand Projections Provided to Wholesale Suppliers

Wholesaler	2015	2020	2025	2030	2035
City of San Diego (afy)	9,397	12,355	12,735	13,127	13,531

4.4 WATER USE REDUCTION PLAN

In response to multiple group affiliations, MOUs, statutory requirements, and concern for the region's water supply sustainability, California American Water employs multiple tactics to conserve water. The major tactics currently being implemented by California American Water include conservation measures, CUWCC Best Management Practices (BMPs) implementation, and conservation rate structures. All of these tactics are currently being implemented or are in the process of being implemented in the near future. The projected demand incorporates all of these conservation strategies.

The District expects to achieve the per capita water use targets through continued implementation of BMPs, participation in regional conservation campaigns, and potential utilization of recycled water for non-potable needs:

(1) BMPs: The District will continue to implement BMPs according to the CUWCC MOU. The District is expected to meet its 2020 per capita water use target. Refer to Section 7 for a detailed discussion of the District's BMPs.

(1) Regional Conservation Campaigns: The District benefits from conservation efforts carried out by the City of San Diego and SDCWA. The City of San Diego's campaign, "No Time to Waste, No Water to Waste," educates the public on water conservation and on water restrictions in the City's service area during drought periods (5). The City has extended this campaign into the District's service area. Additionally, the District's customers are exposed to the campaign through the City's media outreach efforts, which include public awareness events, advertising, and public service announcements. More discussion on the City's public outreach efforts are discussed in Section 7 of this UWMP and Section 5 of the City's 2015 UWMP (5). SDCWA is conducting regional outreach, including their recently branded regional conservation campaign, WaterSmart. The goal of the WaterSmart program is to promote outdoor water-use efficiency through financial incentives (8). More details on SDCWA's regional conservation efforts can be found in Section 3 of SDCWA's 2015 UWMP (8).

(2) Recycled Water Projects: Potentially implementing recycled water projects in the District will allow the District to reduce potable demand and assist the District in reaching the per capita water use target. Recycled water uses and projects are described in Section 5.6.3.

Through the combined effect of the efforts listed above, the District is expected to continue meeting their per capita water use reduction targets.

5 SYSTEM SUPPLIES

5.1 WATER SOURCES

All of the San Diego County District's water is purchased from the City of San Diego. Figure 5-1 illustrates how the water conveyed from its origin to the District.

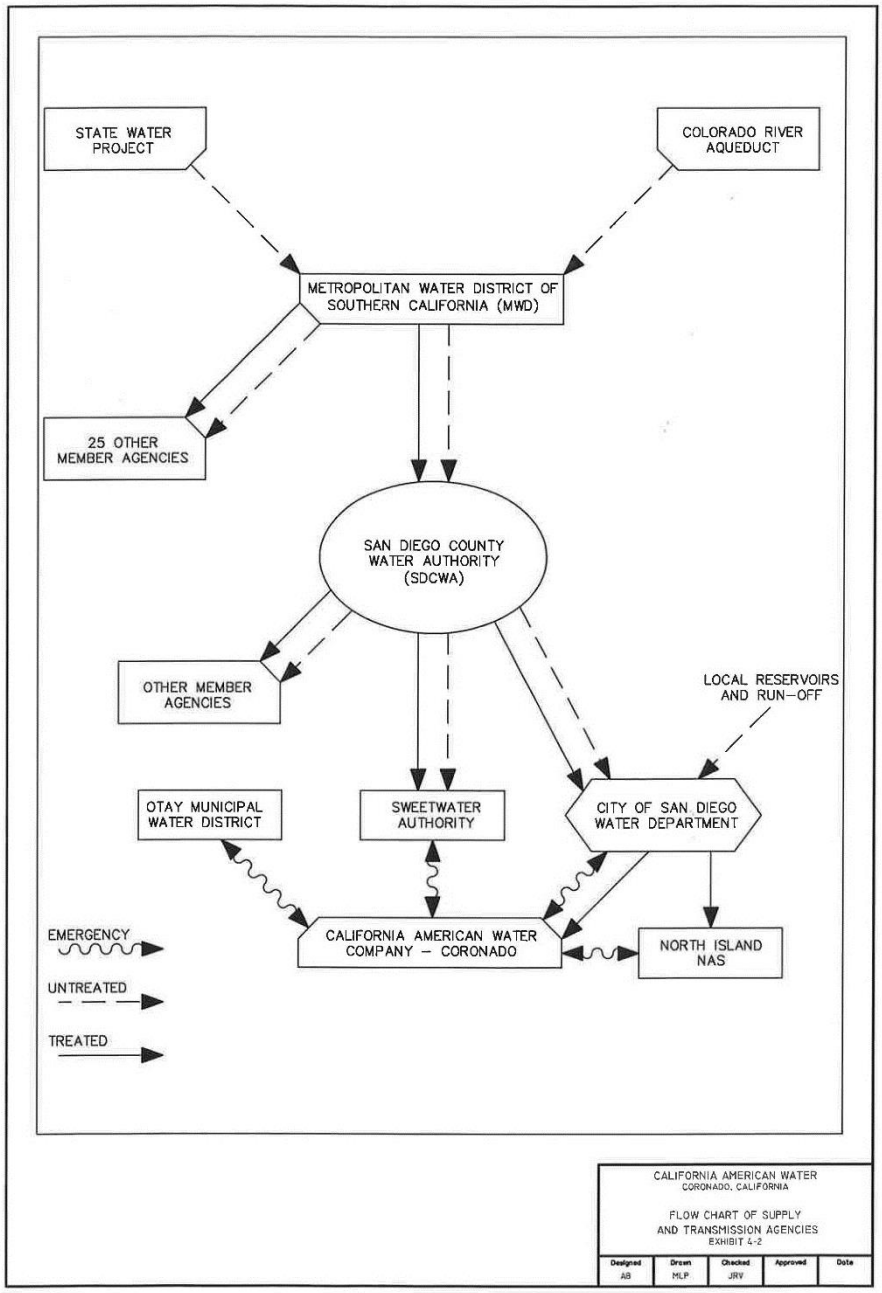

Figure 5-1. Water Supply Flow Chart (3)

The following sections describe the key water agencies shown in Figure 5-1, in the same order as the flow chart (beginning with Metropolitan Water District of Southern California (MWD) and ending with California American Water's San Diego County District).

5.1.1 Metropolitan Water District of Southern California (MWD)

MWD is a public agency that serves wholesale water supplies to the Southern California coastal plain, from Oxnard in the north to the U.S.-Mexico border in the south, as shown in Figure 5-2. MWD's total service area is approximately 5,200 square miles. MWD has 26 member agencies, the largest of which is the San Diego County Water Authority (SDCWA). MWD is a water wholesaler, providing both treated and untreated water to its member agencies. MWD does not have any retail customers (9).

MWD currently receives imported water from two sources: (1) the Colorado River via the Colorado River Aqueduct (CRA), and (2) the State Water Project (SWP) via the California Aqueduct (9). The planned sources of supply for MWD for 2010-2030, assuming a normal water year, are shown in Table 5-1.

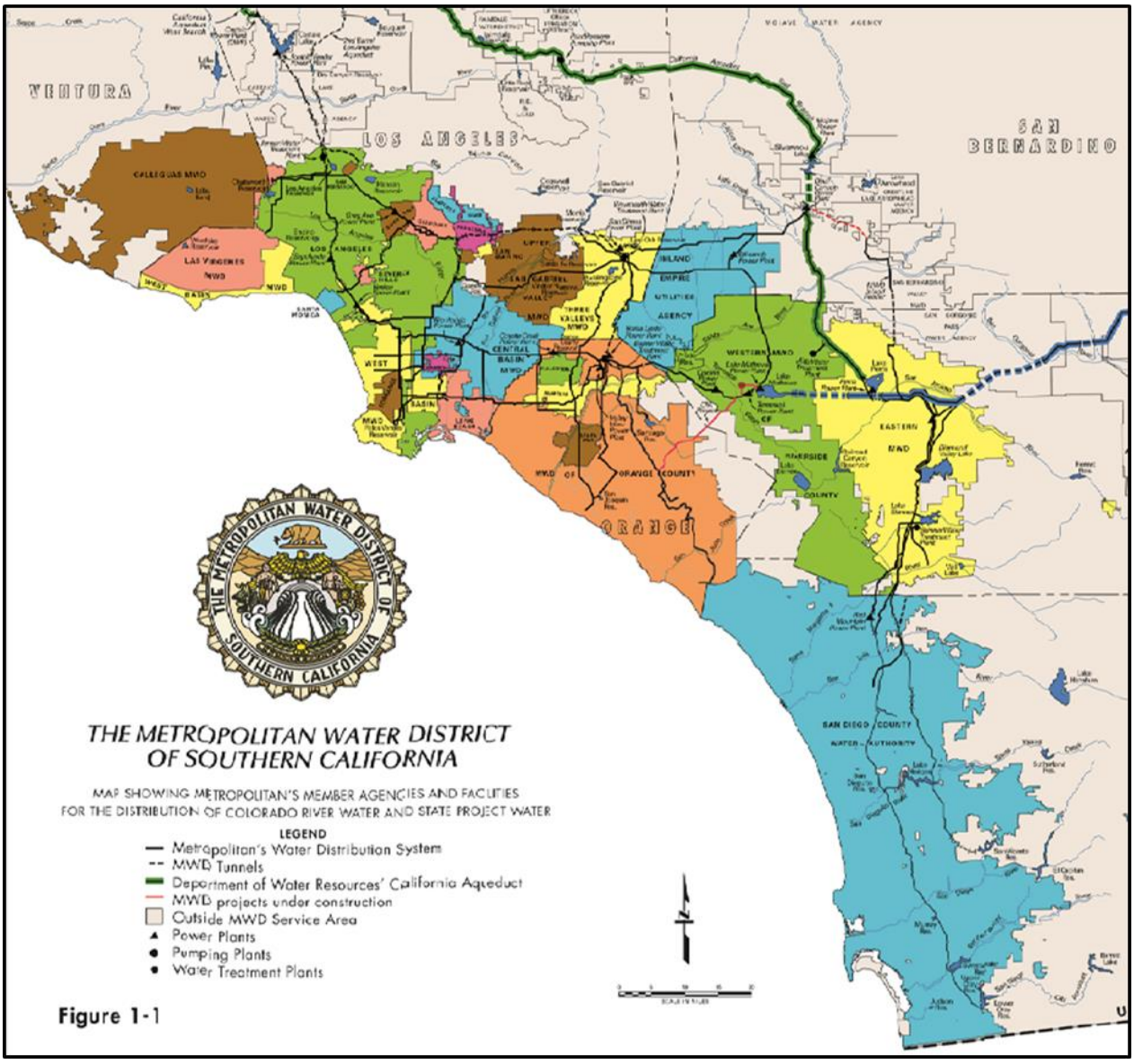

Figure 5-2. MWD Service Area (10)

Table 5-1. MWD Planned Sources of Supply for 2020-2035[1]

Supply Source	2020		2025		2030		2035	
	afy	% of Total	afy	% of Total	afy	% of Total	afy	% of Total
SWP	1,760,000	48%	1,781,000	47%	1,873,000	48%	1,899,000	47%
CRA	1,200,000	33%	1,200,000	32%	1,200,000	31%	1,200,000	30%
In-Region Storage and Programs	693,000	19%	774,000	21%	852,000	22%	956,000	24%
Total	**3,653,000**	**100%**	**3,755,000**	**100%**	**3,925,000**	**100%**	**4,055,000**	**100%**

[1] Source: Draft 2015 MWD Regional UWMP (10)

5.1.2 San Diego County Water Authority (SDCWA)

SDCWA is a public agency that serves the San Diego region, from Orange and Riverside counties in the north to the U.S.-Mexico border in the south, as shown in Figure 5-3. The total service area is approximately 1,486 square miles. SDCWA has 24 member agencies, the largest of which is the City of San Diego. SDCWA is a water wholesaler; member agencies purchase water from SDCWA and distribute it within their service areas. SDCWA is the main water supplier in San Diego county.

SDCWA purchases water from MWD, the Imperial Irrigation District (IID), supplies from the Carlsbad Desalination Plant, canal lining projects that are wheeled through MWD's conveyance facilities, and spot water transfers that are pursued on an as-needed basis to offset reductions in supplies from MWD (8). SDCWA delivers water to its members through large pipelines located in two north-south aqueducts and also several east-west pipelines that extend into member agency service areas (8).

The planned sources of supply for SDCWA for 2020-2035 assuming a normal water year are shown in

Table 5-2.

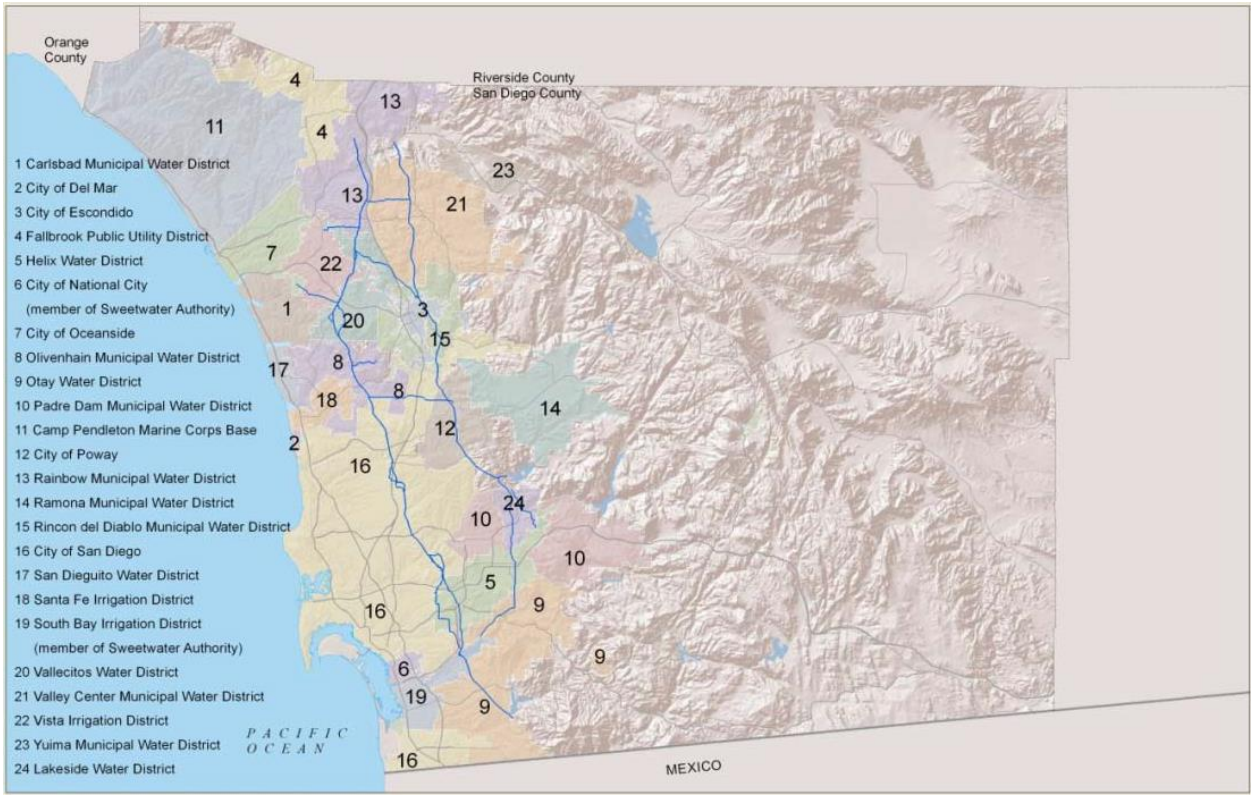

Figure 5-3. SDCWA Service Area (8)

Table 5-2. SDCWA Planned Sources of Supply for 2020-2035

Supply Source	2020		2025		2030		2035	
	afy	% of Total[1]	afy	% of Total[1]	afy	% of Total[1]	afy	% of Total[1]
MWD (Purchased)	150,850	33%	170,710	36%	191,485	40%	203,717	42%
IID (Transfer)	190,000	42%	200,000	42%	200,000	42%	200,000	41%
AAC and CC Lining Projects	80,200	18%	80,200	17%	80,200	17%	80,200	16%
Proposed Regional Seawater Desalination	50,000	11%	50,000	10%	50,000	10%	50,000	10%
Member Agency Supplies	130,811	29%	149,071	31%	150,895	31%	156,595	32%
Total	**451,011**	**100%**	**479,271**	**100%**	**481,095**	**100%**	**486,795**	**100%**

[1]Percentages may not add up to 100 due to rounding.
Source: Draft 2015 SDCWA UWMP (8)

5.1.3 City of San Diego

The City of San Diego's Water Department operates the City's public water system to treat and deliver water. The City's service area is in the south central part of San Diego County and encompasses approximately 340 square miles, as shown in Figure 5-4. The City sells water both to retail customers and to other water agencies, including California American Water, for retail distribution within their service areas (11).

The City's supply is largely made up of imported water purchased from SDCWA and MWD. Imported water accounts for up to 93% of the City's supply (11). The City purchases both raw water and treated water. The City treats the raw water at three treatment plants (Miramar, Alvarado, and Otay) (3). In addition, the City's system utilizes local groundwater, recycled water and has nine local surface water reservoirs to capture rainwater and runoff (11). The planned sources of supply for the City of San Diego for 2020-2035 are summarized in Table 5-3.

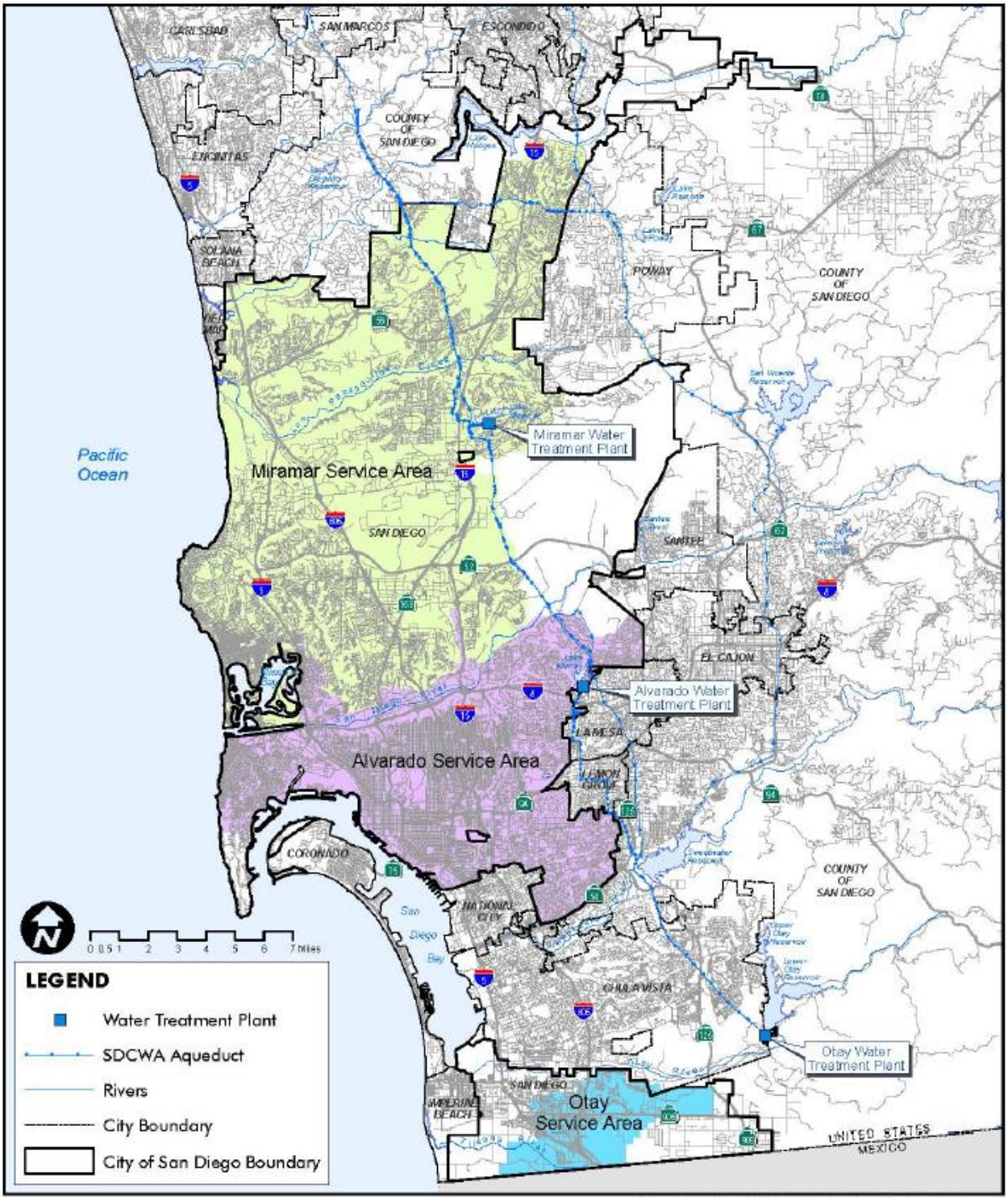

Figure 5-4. City of San Diego Service Area (5)

Table 5-3. City of San Diego Planned Sources of Supply for 2020-2035

Supply Source	2020		2025		2030		2035	
	afy	% of Total[1]	afy	% of Total[1]	afy	% of Total[1]	afy	% of Total[1]
SDCWA (Purchased)	163,439	82%	202,488	84%	225,390	85%	234,398	86%
Local Surface Water	22,900	11%	22,800	9%	22,700	9%	22,600	8%
Groundwater	500	0.2%	3,100	1%	3,100	1%	3,100	1%
Recycled Water	13,650	7%	13,650	6%	13,650	5%	13,650	5%
Total	**200,489**	**100%**	**242,038**	**100%**	**264,840**	**100%**	**273,748**	**100%**

[1] Percentages may not add to 100 due to rounding.
Source: 2015 City of San Diego UWMP (11)

5.1.4 California American Water's San Diego County District

California American Water's San Diego County District purchases all of its water supply from the City of San Diego. The water is received from the City of San Diego through four primary connections and one standby connection (3). The connections and average percent of the supply that entered the District's system in 2015 through each connection are shown in Table 5-4. The location of each connection is shown in Figure 5-5. As shown in Figure 5-1, the San Diego County District also has three emergency interconnections, one with each of the following: Otay Water District (Otay WD), Sweetwater Authority and North Island Naval Air Station. Figure 5-5 shows the location of each emergency connection.

Table 5-4. Purchased Water Connections with the City of San Diego

Location	Percent of Supply in 2010[2]
Harbor Drive	35%
Howard & Iris	13%
Montgomery	51%
Pueblo Del Rio	<1%
Other[1]	< 1%
Total	**100%**

[1]Other sources include standby connection at Hollister St. and emergency connections with Otay WD and Sweetwater Authority.
[2]From 2015 system delivery provided by California American Water.

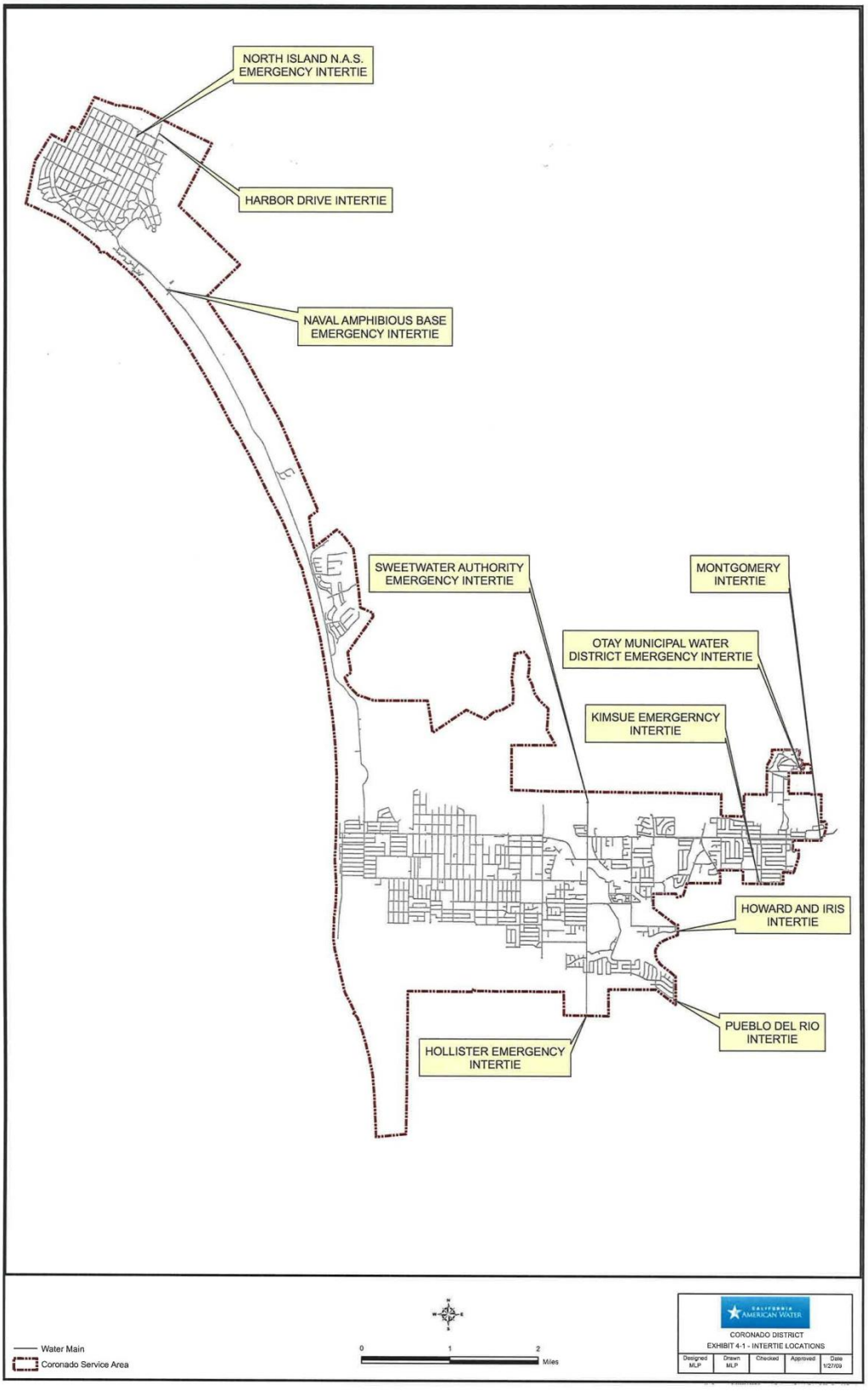

Figure 5-5. California American Water Interties (12)

The San Diego County District entered a new Water Purchase contract with the City of San Diego on May 11, 2004 (13). The length of the contract is 25 years. The contract contains a methodology for calculating the minimum contract amount of water to be purchased and the maximum contract amount of water available for purchase:

(1) **Minimum Contract Amount:** The minimum contract amount of water required to be purchased is 60% of the average system delivery per customer per day, where the average system delivery per customer per day is calculated at the beginning of each fiscal year based upon the prior 24 months ending June 30 (13). The minimum contract amount is required to be met on an annual basis.

(2) **Maximum Contract Amount:** The maximum amount of water available for purchase is 120% of the average system delivery per customer per day, where the average system delivery per customer per day is calculated at the beginning of each fiscal year based upon the prior 24 months ending June 30 (13). The maximum contract amount is an annual limit.

If the City of San Diego has water available, the City of San Diego may agree to sell more than the maximum contract amount to the San Diego County District (13).

Deliveries of water from the City of San Diego to the San Diego County District are subject to reduction in the same proportion as the City of San Diego is reducing deliveries to other city customers (13).

5.2 GROUNDWATER

The District does not extract groundwater. Sources of supply for the wholesale water agencies that supply the District are shown in Section 5.1.

Although the District does not currently extract groundwater, the District lies above two groundwater basins, the Otay Valley and the Tijuana Groundwater Basins (see Figure 5-6). The District has produced groundwater in the past from the Otay Valley Groundwater Basin through a single well, known as Well No. 8. The dates of production and quantities of production from Well No. 8 are unknown as the well was abandoned over 30 years ago. While the District no longer operates this well, opportunities for groundwater production from the Otay Valley and Tijuana Groundwater Basins may exist.

5.2.1 Otay Valley Groundwater Basin

DWR's Bulletin 118 provides a summary of the Otay Valley Groundwater Basin (basin number 9-18) (14). The basin is located in southwestern San Diego County, adjacent to the Pacific Ocean, and has a surface area of 11 square miles. Water may be found in three primary formations: alluvium (well yields up to 300 gallons per minute (gpm)), the San Diego Formation (well yields from 150-400 gpm), and the Otay Formation (well yields from 10-50 gpm). The basin is primarily recharged from percolation of precipitation, stream-flow originating in valley highlands, and return of applied water. There is insufficient information available on the basin to develop a groundwater budget (14).

Groundwater located in the coastal plain area of the Otay Valley Groundwater Basin, which is the area that lies beneath the District, is rated marginal to inferior for domestic use. This is due to high total dissolved solids (TDS) content. Water is also rated marginal to inferior for irrigation purposes due to the high chloride concentrations (14).

While treatment may be expensive, groundwater production is feasible. Yields from municipal and irrigation wells in the basin range from 1 to 1,000 gpm with an average well yield of 185 gpm, based on 81 well completion reports (14).

In 2011, the City of San Diego installed a deep monitoring well near Chollas Creek that will provide valuable information for a proposed San Diego Formation Groundwater Production Project. This project, located at the Diamond Business Improvement District Well Field and Disinfection Facility, will extract fresh water from a confined aquifer system within the San Diego Formation. For this conceptual project, the extracted groundwater could be conveyed to Mount Hope Cemetery for non-potable irrigation, and the remainder will be disinfected and delivered to the potable distribution system. The facilities could be operational by 2025 with delivery of 800 AFY and ramping up production to 1,600 afy by 2030.

5.2.2 Tijuana Groundwater Basin

DWR's Bulletin 118 provides a summary of the Tijuana Groundwater Basin (basin number 9-19) (15). The basin is adjacent to the Pacific Ocean, with the international border with Mexico as its southern boundary. The basin lies beneath a portion of the Tijuana River Valley that lies within California. Water may be found in two primary formations: Quaternary alluvium (well yields up to 2,000 gpm, with an average of 1,000 gpm) and the San Diego Formation (well yields up to 1,000 gpm, with an average of 350 gpm). The basin is primarily recharged from the Tijuana River and controlled releases from two reservoirs in San Diego County (Barrett and Morena Reservoirs) and one reservoir in Mexico (Rodriguez Reservoir) (15).

The groundwater in the basin has historically moved westward towards the Pacific Ocean. From the 1950s to 1970s, water levels in the basin declined which allowed seawater to move eastward and infiltrate the aquifer. In the 1970s, changes to pumping practices were made and by the 1990s, the groundwater began to flow westward again (15).

The basin's storage capacity is estimated to be about 50,000 to 80,000 AF. According to the DWR Bulletin, SDCWA reports annual production from the Quaternary alluvium to be about 1,500 AFY. Production from the San Diego Formation is unknown (15).

The International Boundary and Water Commission monitors groundwater levels and water quality through 28 wells in the basin. Groundwater from the basin contains high levels of sodium and chloride, with TDS concentrations ranging from 380 to 3,620 mg/L. Some wells in the basin have been recorded to exceed maximum contaminant levels (MCLs) for certain contaminants, including chlorite and sulfate (15).

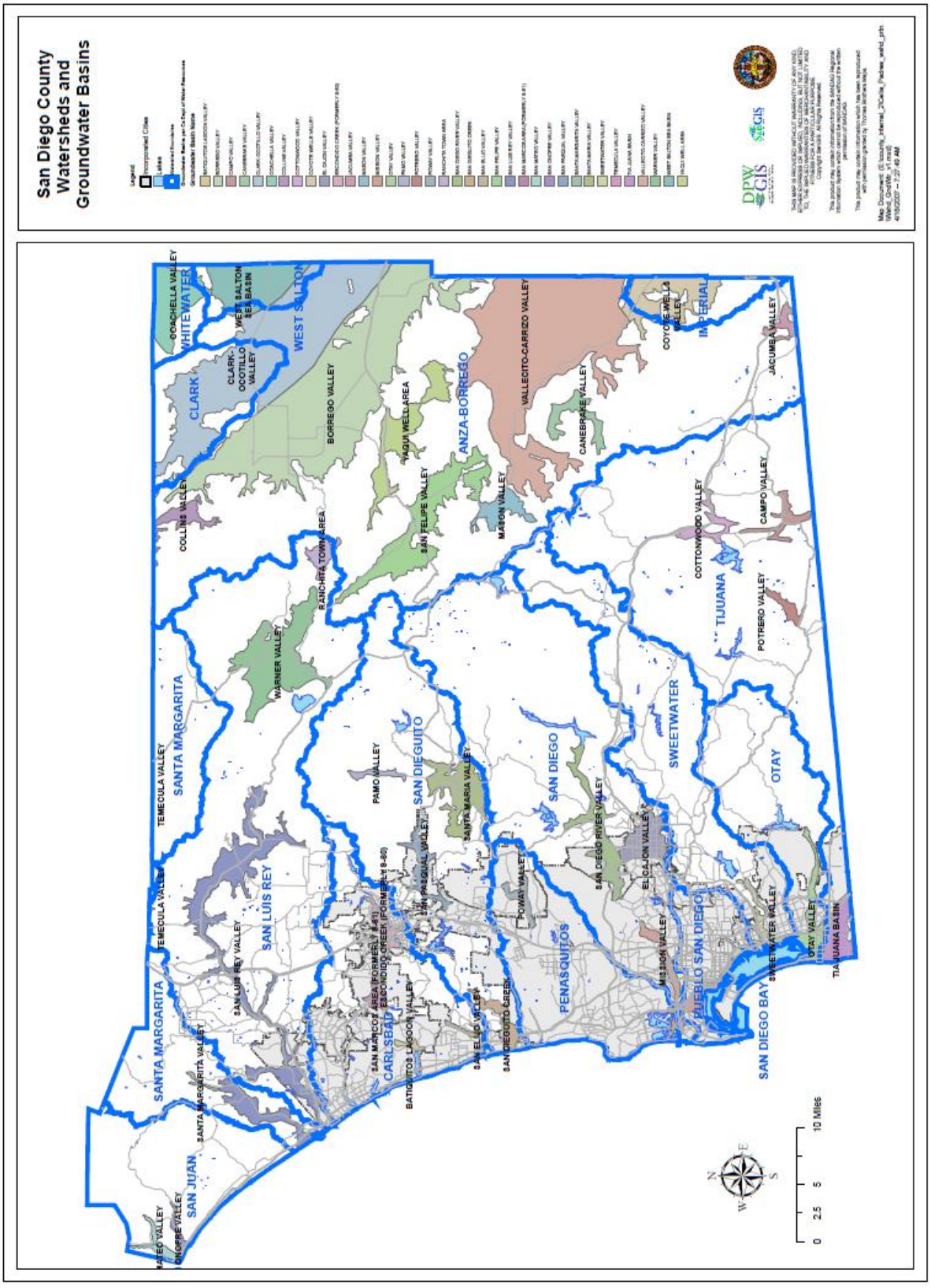

Figure 5-6. San Diego County Watersheds and Groundwater Basins (16)

5.3 SURFACE WATER

The District does not have its own surface water supply. Sources of supply for the wholesale water agencies that supply the District are shown in Section 5.1.

5.4 TRANSFER OPPORTUNITIES

The District is not presently pursuing transfer opportunities. However, transfer opportunities may exist in the future between California American Water and Otay WD or Sweetwater Authority. The emergency connections with Otay WD and Sweetwater Authority have been upgraded and now allow flow both into and out of California American Water's system. This bi-directional flow capability would allow for water transfers.

5.5 DESALINATED WATER OPPORTUNITIES

Carlsbad desalination plant (officially known as the Claude "Bud" Lewis Carlsbad Desalination Plant) is a desalination plant that opened on December 14, 2015 in Carlsbad, California, adjacent to the north end of the Encina Power Station. The San Diego County Water Authority (SDCWA) is the recipient of the fresh water produced by the plant. The entire desalination project cost about $1 billion for the plant, pipelines, and upgrades to existing SDCWA facilities to use the water.

The fresh water output from the plant will be sent by a 10-mile (16 km) long, 4.5-foot (1.4 m) diameter pipeline, utilizing six pumps, to connect to the SDCWA distribution system in San Marcos. Pipeline construction began in 2013, was completed June 28, 2015 and came online six months later after testing.

Desalination will provide the San Diego area with a local source of supply. SDCWA has been investigating desalination since 1990 and developed a Desalination Action Plan in 2006, which calls for 89,000 AF of new local and regional desalination supplies by 2030. In addition, the Desalination Action Plan calls for additional evaluation of project sites, including smaller projects like brackish water desalination plants (17). SDCWA and other local agencies have been actively pursuing funding at the federal, state, and local levels to evaluate and develop desalination projects.

With the desalinated water pursuits occurring in the San Diego area, the San Diego County District may have the opportunity to purchase desalinated water which would reduce its dependence on imported supplies and/or the City of San Diego. Three approaches for the District to incorporate desalinated water supplies are discussed in the following subsections, including: desalinated brackish groundwater from the Sweetwater Authority or the Otay WD; the Carlsbad Desalination Project; and the Camp Pendleton Desalination Project.

5.5.1 Carlsbad Desalination Project

The Carlsbad desalination plant (officially known as the Claude "Bud" Lewis Carlsbad Desalination Plant) is a desalination plant that opened on December 14, 2015 in Carlsbad, California, adjacent to the north end of the Encina Power Station. The SDCWA, the recipient of the fresh water produced by the plant, calls it "the nation's largest, most technologically advanced and energy-efficient seawater desalination plant" (18).The entire desalination project cost about $1 billion for the plant, pipelines, and upgrades to existing SDCWA facilities to use the water.

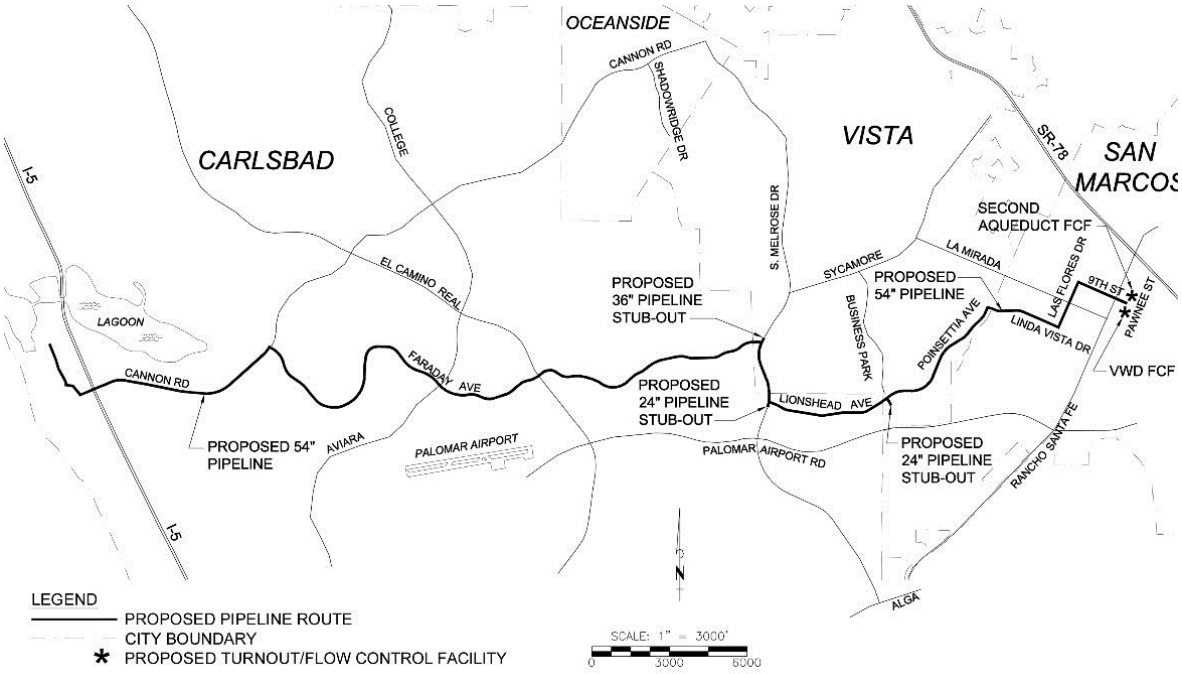

Figure 5-7. Carlsbad Desalination Conveyance Pipeline Map (19)

As a member of SDCWA, the City of San Diego will benefit from this new source of supply. The District will likewise benefit as the District purchases its supply from the City.

5.5.2 Camp Pendleton Desalination Project

SDCWA is leading the development of the Camp Pendleton Desalination Plant. SDCWA completed an engineering feasibility study in 2009 that evaluated two site alternatives located in the southwest region of Camp Pendleton. The following year, an MOU between the Water Authority and Marine Corps Base (MCB) Camp Pendleton was executed to establish the framework for cooperation between the two parties during the performance of additional technical and environmental studies. The MOU did not commit either party to advance the project beyond the planning studies contemplated in the MOU. For SDCWA planning purposes, the MCB Camp Pendleton desalination project is not considered a verifiable supply and is therefore not included in SDCWA reliability assessment. The project is categorized as an additional planned project.

In October 2013, these additional planning-level studies and field investigations were finalized to further define project requirements, including the feasibility of subsurface and screened open ocean intake alternatives, brine discharge methods, treatment processes and plant configurations, power supply requirements, alternative conveyance alignments, the integration of new supplies into the regional aqueduct system, and impacts to MCB Camp Pendleton operations. The results further validated overall project feasibility, including the viability of both the screened open ocean and subsurface intakes, and the practicality of a diffuser type brine discharge system.

The project was also considered in SDCWA's 2013 Regional Water Facilities Optimization and Master Plan Update as a new supply alternative ("Supply from the West" option) capable of addressing the region's long-term need for new supply development. The Master Plan Update recommended an adaptive management approach for a future MCB Camp Pendleton project. Future major decisions affecting project implementation would need to be considered, including the implementation of the City of San Diego's Pure Water Program.

The 2013 Master Plan Update further noted that timely regulatory review and successful permitting may hinge on the viability of the open-ocean or subsurface intake options to provide feedwater for the reverse osmosis membranes. As an initial incremental development step, intake studies should be performed to physically demonstrate the two seawater intake technologies. In March 2015, the SDCWA Board approved the intake studies and awarded a contract in September 2015 to execute the Intake Testing Program. This testing program was initiated in late 2015 and is anticipated to take approximately two years to complete.

If SDCWA decides to continue to develop the Camp Pendleton Desalination Project based on the results of its master planning effort, California American Water's San Diego County District would receive water from this desalination plant because the City of San Diego, the District's supplier, is a member agency of SDCWA.

5.6 RECYCLED WATER OPPORTUNITIES

California America Water does not own or operate wastewater collection or treatment facilities or recycled water distribution facilities at this time. While there are no recycled water capital projects underway in the District, several recycled water feasibility studies have been performed or are in process. These feasibility studies are discussed in Section 5.6.3.

5.6.1 Wastewater System Description

Wastewater generated within the San Diego County District's service area is collected by each of the respective overlying cities (Coronado, Imperial Beach, San Diego and Chula Vista). Wastewater treatment and disposal is provided by the City of San Diego's Metropolitan Wastewater Department (MWWD). Most of the San Diego County District's wastewater is currently treated at MWWD's Point Loma Wastewater Treatment Plant, the largest wastewater plant in MWWD's system. The facility has a treatment capacity of 240 mgd. The facility processes wastewater at an advanced primary treatment level. The treated wastewater is discharged to the ocean through a 4.5-mile ocean outfall at a depth of 320 feet.

Some of the wastewater generated in the San Diego County District's service area is diverted to MWWD's South Bay Water Reclamation Plant (SBWRP), which is located in the Tijuana River Valley near the U.S.-Mexico border (20). The SBWRP opened in 2002, but did not begin distributing recycled water until 2006. The SBWRP has a treatment capacity of 15 mgd (inflow) and a maximum recycled water production capacity of 13.5 mgd (outflow) (21). In 2009, 75% of the reclaimed water was beneficially used by the Otay Water District, the South Bay International Wastewater Treatment Plant, or used for in-plant processes. In the warmer months, almost 100% of reclaimed water was reused (22).

Wastewater collected in the District was estimated based on population projections and unit wastewater flow rates. This analysis uses the same wastewater flow rates assumed in the City of Chula Vista's 2005 Wastewater Master Plan, which are 70 gallons per capita per day and 20 gallons per employee per day (23). The exact quantity of wastewater generated in the District that is diverted and treated to recycled water standards at the SBWRP is unknown. Therefore, the percentage of wastewater generated by the City of San Diego's entire service area that is treated to recycled water standards was applied to the wastewater generated in the District. This provides an estimate of the wastewater generated in the District that is treated to recycled water standards. Note that this recycled water is treated by the City of San Diego and is not used within the District.

Table 5-5 summarizes the quantity of wastewater collected and the quantity that is treated to recycled water standards.

Table 5-5. Wastewater Collected and Treated

Type of Wastewater	2015	2020	2025	2030	2035
Wastewater collected & treated in service area (afy)[1]	8,567	8,395	8,651	8,914	9,147
Volume that meets recycled water standard (afy)[2]	1,198	1,146	1,152	1,149	1,138

[1]Assumes 70 gallons per capita per day and 20 gallons per employee per day (23). Population estimates based on Census and SANDAG data. Employee estimates based on the SANDAG Series 13: 2050 Regional Growth Forecast.
[2] Assumes 14.0% of wastewater is recycled in 2015, 13.6% in 2020, 13.3% in 2025, 12.9% in 2030, and 12.4% in 2035. This is based on the percentage of wastewater from the entire City's service area that is treated to recycled water standards, as reported in the City of San Diego's 2015 UWMP (24).

Wastewater from the Point Loma Wastewater Treatment Plant is disposed of through ocean outfall. Additionally, treated water from the SBWRP that is not beneficially reused is disposed of through ocean outfall (5). The percentage of wastewater discharged at each outfall by the City of San Diego was applied to the volume of wastewater generated in the District that was not assumed to be recycled. This provides an estimate of the quantity of wastewater discharged to the ocean at each facility. The wastewater disposal methods and quantities are shown in Table 5-6.

Table 5-6. Disposal of Wastewater (non-recycled)

Method of Disposal	Treatment Level	2015	2020	2025	2030	2035
Point Loma Ocean Outfall (afy)[1]	Advanced Primary	7,265	7,200	7,449	7,714	7,959
SBWRP Ocean Outfall (afy)[1]	Secondary or better	105	50	50	50	50
Total		7,369	7,250	7,499	7,765	8,009

[1]Assumes the following percentage of non-recycled wastewater is disposed of at the Point Loma ocean outfall: 98.6% in 2015, 99.3% in 2020, 99.3% in 2025, 99.4% in 2030, 99.4% in 2035, with the remainder being disposed of through the SBWRP ocean outfall. This is based on the percentage of non-recycled wastewater discharged by the City of San Diego at each facility, as reported in the City of San Diego's 2010 UWMP (5).

5.6.2 Recycled Water Supply and Uses

The District does not currently purchase recycled water or use any recycled water as a source of supply.

As described above, the City of San Diego collects and treats all wastewater generated in the District, some of which is treated to recycled water standards at the SBWRP. The City has two recycled water service areas, the Southern Service Area and the Northern Service Area (shown in Figure 5-8). Recycled water supplied to the Southern Service area is treated at the SBWRP (5). The City of San Diego delivers recycled water for non-potable uses, including irrigation, industrial and construction purposes, decorative fountains, and toilet flushing (5). In addition, the City sells recycled water to several wholesale customers, including the Otay WD, which receives recycled water from the SBWRP. The Otay WD uses recycled water for non-potable uses, offsetting potable water demands. For more information on the City of San Diego's use of recycled water and the City's recycled water plans, refer to Section 6.4 of the City of San Diego's 2010 UWMP (5).

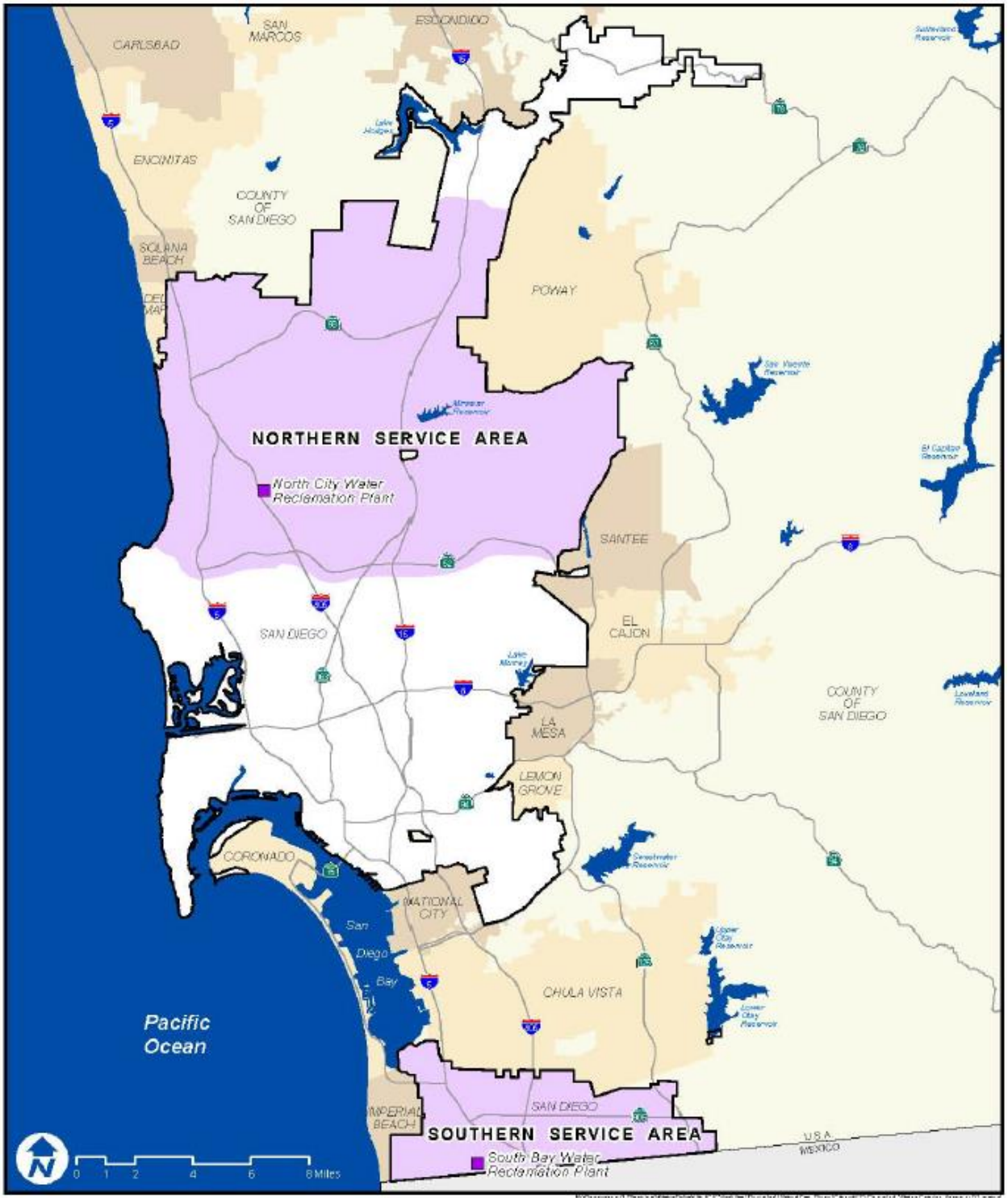

Figure 5-8. City of San Diego Recycled Water Service Areas (5)

5.6.3 Recycled Water Use Optimization

Recycled water is not currently delivered to or used in the District. The primary potential use for recycled water in the District is landscape irrigation at public parks, golf courses, government facilities and schools. Table 5-7 shows the potential recycled water use in the District assuming all dedicated irrigation demand is provided by recycled water. Potential recycled water use does not consider whether the necessary recycled water infrastructure exists or is planned.

Table 5-7. Potential Recycled Water Use in Service Area

User type	Description	2020 (afy)	2025 (afy)	2030 (afy)	2035 (afy)
Agricultural irrigation	N/A	0	0	0	0
Landscape irrigation[1]	Tertiary Treatment	333	333	333	333
Commercial irrigation[1]	Tertiary Treatment	294	294	294	294
Golf course irrigation[1]	Tertiary Treatment	365	365	365	365
Wildlife habitat	N/A	0	0	0	0
Wetlands	N/A	0	0	0	0
Industrial reuse	N/A	0	0	0	0
Groundwater recharge	N/A	0	0	0	0
Seawater barrier	N/A	0	0	0	0
Geothermal/Energy	N/A	0	0	0	0
Indirect potable reuse	N/A	0	0	0	0
Total		**992**	**992**	**992**	**992**

[1]California American Water 2010 customer database was used to apportion landscape water use to each irrigation category (landscape irrigation, commercial irrigation, and golf course irrigation).

In 2005, the City of San Diego prepared a Recycled Water Master Plan (RWMP) Update (25). The RWMP outlined the City's broad plan to increase recycled water use in its Northern, Central and Southern Service Areas. California American Water's San Diego County District is included in the City of San Diego's Southern Service Area and is listed as one of the largest potable water users in the Southern Service Area. However, there are currently no plans to extend the City of San Diego's recycled water distribution system into the San Diego County District. The City of San Diego's expansion in the Southern Service Area is primarily focused on opportunities with the Otay Water District and Sweetwater Authority (25).

In 2005, a study to assess the feasibility of on-site water reclamation at the City of Coronado's Municipal Golf Course was performed (26). On-site water recycling (OSR) is seen as a viable alternative for golf courses where there are no existing or planned recycled water pipeline networks. The study concluded that an OSR system with a rated capacity of 400,000 gallons per day could supply 100% of the total annual irrigation demands of the Coronado Golf Course, Tidelands Park, and the CalTrans State Route 75 landscape easement. The approximate areas and estimated water demand for irrigation are shown in Table 5-8. At the time of the study, this system was estimated to cost $12.4 million, which translated to a cost of approximately $2,700/af without rebates or credits. For comparison, the delivered cost of water from California American Water for golf course irrigation was $950/af at that time if this study.

Table 5-8. Locations in Coronado with Greatest Potential for Recycled Water Use (26)

Site Location	Estimated Irrigated Area (acres)	Estimated Water Demand[1] (afy)
Coronado Golf Course	110	365
Tidelands Park	6	55
CalTrans Route 75 easement	24	18
Total	**140**	**438**

[1] California American Water Recycled Water Study

In 2011, the City of Coronado commissioned a water reclamation feasibility study to review prior studies and identify new alternatives. The study concluded the reclamation plant was feasible but there were concerns expressed about the location including odor control, site access, visual impact, compatibility with the golf course setting and use, along with public perception. In December 2011, the study was accepted by the City Council and staff was directed to monitor the fiscal assumption and investigate alternate project delivery methods, site locations and partnering opportunities.

In 2014, the Navy approached the city and indicated its interest in partnering on a possible plant that would service the Navy and City facilities. In December 2014, the City Council authorized a study to look at the feasibility of the partnership and the location of the facility on Navy property.

In 2015, the District contracted with an engineering firm to assess the potential of providing recycled water to existing customers within the Coronado and Imperial Beach service areas. This proposed capital

investment project includes the delivery of recycled water for landscaping for existing customers such as parks, schools, city landscaping, and golf courses. It is estimated that the project would require a significant amount of recycled water pipe to be installed between the City of Imperial Beach and the City of Coronado. The potential customers receiving service would have separate meters and rates for the proposed recycled water supply. As currently envisioned, the proposed project will also include a Wastewater Reclamation Facility, the location of which has not yet been determined. It is expected this facility would have appropriate treatment processes to meet the California Code of Regulations Title 22 criteria for disinfected tertiary recycled water for irrigation. This project is still in the very preliminary planning stages, and initial discussions with interested parties indicate an interest in the project. This project is scheduled to begin with preliminary engineering design and permitting activities in 2018, and continuing into 2019-2020. At this time, initial construction is not planned to commence until 2024 or later.

For the purposes of this UWMP, it is assumed that the project, as described in the previous paragraph, could be constructed and operational by 2030, and is therefore reflected in Table 5-9.

Table 5-9. Projected Future Recycled Water Use in Service Area

User type	Description	2015 (afy)	2020 (afy)	2025 (afy)	2030 (afy)
Agricultural irrigation	N/A	0	0	0	0
Landscape irrigation[1]	Tertiary Treatment	0	0	131.5	131.5
Commercial irrigation	Tertiary Treatment	0	0	0	0
Golf course irrigation[2]	Tertiary Treatment	0	0	365	365
Wildlife habitat	N/A	0	0	0	0
Wetlands	N/A	0	0	0	0
Industrial reuse	N/A	0	0	0	0
Groundwater recharge	N/A	0	0	0	0
Seawater barrier	N/A	0	0	0	0
Geothermal/Energy	N/A	0	0	0	0
Indirect potable reuse	N/A	0	0	0	0
Total		**0**	**0**	**496.5**	**496.5**

[1] Assumes recycled water is used to irrigate locations listed in Table 5-10.
[2] Assumes recycled water is used to irrigate Coronado Municipal Golf Course.

Table 5-10 shows the projected recycled water for 2010 as predicted in the 2010 UWMP as well as the actual recycled water use in 2015.

Table 5-10. 2010 UWMP Recycled Water Use Projected for 2015 & Actual 2015 Recycled Water Use

Use Type	2015 Actual Use (afy)	2010 Projection for 2015 (afy)
Agricultural irrigation	0	0
Landscape irrigation	0	0
Commercial irrigation	0	0
Golf course irrigation	0	0
Wildlife habitat	0	0
Wetlands	0	0
Industrial reuse	0	0
Groundwater recharge	0	0
Seawater barrier	0	0
Geothermal/Energy	0	0
Indirect potable reuse	0	0
Total	**0**	**0**

5.7 FUTURE WATER PROJECTS

California American Water develops capital improvement projects as a part of the Comprehensive Planning Studies (CPSs) which are periodically prepared for each service area. CPSs are typically prepared on a five to eight-year cycle with interim updates prepared as conditions change or the need arises. The most recent CPS was prepared in 2012. Each service area is evaluated for specific needs from which a prioritized list of projects is developed. Projects are generally classified into one of several categories as follows: Source of Supply, Storage, Conjunctive Use, and Water Quality / Water Efficiency. Some projects meet multiple planning goals across two or more of the listed categories. A storage project, for example, not only provides increased system reliability but also assists in meeting peak hour demands often delaying the need for additional source of supply.

Currently, the San Diego County District does not have any capital projects planned to increase water supply. The projects identified in the 2012 CPS are focused on improving condition of existing infrastructure (12).

6 SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

6.1 WATER SUPPLY RELIABILITY

Historically, California American Water has been able to meet 100% of its demand through purchased water from the City of San Diego, and it is assumed that supply reliability of purchased water will be 100% for the timeframe of this plan. The District's contract with the City of San Diego, which dates back to 1912, was renewed for 25-years in 2004, making the purchased water supply a secure source. As described in Section 5.1.4, the City of San Diego is required to make up to 120% of the average system delivery per customer per day available to the District for purchase. Under the contract, however, if the City of San Diego implements mandatory reductions, the District is subject to delivery reductions from the City in the same proportion as the City's other customers.

6.1.1 Factors Affecting Supply Reliability

The City of San Diego has imported supplies and local surface water supplies. The City recognizes that climatic uncertainty is the main factor resulting in inconsistency of its local surface water supply (5). The amount of local surface water supply available depends primarily on precipitation. If the local groundwater supply is to be utilized, uncertainty due to water quality needs to be considered.

Imported water from SDCWA, which primarily comes from MWD, is affected by additional factors. MWD's supply is imported from the Colorado River and Bay-Delta through the SWP and the CRA, respectively. This imported supply is affected by legal, environmental, water quality and climatic factors.

- **Legal:** Supply allocations from the CRA are dictated through legal agreements and, in some cases, court settlements. Supply from SWP is affected by legal factors, including the Bay-Delta Accord, which changed operating criteria of the SWP and can now significantly reduce supply to MWD in dry years (9).
- **Environmental:** The Colorado River supply is affected by various environmental issues, including conservation programs to protect endangered species (8). In addition, several species of fish located in the Bay-Delta have been listed as endangered, which has led to decreased pumping by the SWP, and environmental litigation (9).
- **Water Quality:** Water from the Colorado River has high salinity levels and also contains perchlorate and uranium, which MWD is monitoring closely. Disinfection byproducts pose water quality issues for the SWP, because they form when total organic carbon and bromide in the source water react with disinfectants at the water treatment plant. Groundwater inflows into the SWP also pose arsenic concerns (9).
- **Climatic:** Variable hydrology in the basins that feed the Colorado River affects CRA supply. Variable hydrology in Northern California affects SWP supply.

The factors resulting in inconsistency of supply for both the City's local and imported sources are summarized in Table 6-1.

Table 6-1. San Diego County District Factors Resulting in Inconsistency of Supply

Water Supply Sources	Legal	Environmental	Water Quality	Climatic
City of San Diego- Local Surface Water[1]			X	X
City of San Diego- Imported Water[2]	X	X	X	X

[1] Source: City of San Diego Draft 2015 Draft UWMP (27)
[2] Source: City of San Diego Draft 2015 Draft UWMP (27), SDCWA 2010 Draft UWMP (8), MWD Draft 2015 Regional UWMP (10).

6.1.2 Supply Reliability

Table 6-2 shows the supply reliability base years for the City of San Diego, the District's sole supply source. Also shown are the supply reliability base years for SDCWA, the largest source of supply for the City of San Diego, and MWD, the largest source of supply for SDCWA.

Table 6-2. San Diego County District Supply Reliability Base Years

Supply Reliability	Average Water Year	Single Dry	Multiple Dry Years
Direct Source			
City of San Diego[1]	1978	1990	1990-1992
Indirect Sources			
SDCWA[2]	N/A	2015	N/A
MWD[3]	N/A	1977	1990-1992

[1] Represents reliability of local surface supply. Source: City of San Diego Draft 2015 UWMP (27)
[2] Source: San Diego County Water Authority Draft 2015 UWMP (8)
[3] Source: Municipal Water District of Southern California Draft2015 Regional UWMP (10)

The City of San Diego projects that supply will meet demand during all hydrologic conditions, as shown in Table 6-3 (11).

Table 6-3. San Diego County District Supply Reliability- Current Water Uses

Water Supply Sources[1]	Average / Normal Water Year Supply	Single Dry Year	Multiple Dry Water Year Supply		
			Year 1	Year 2	Year 3
City of San Diego[1]	100%	100%	100%	100%	100%

[1] During a single dry or multiple dry year scenario, the City of San Diego projects that wholesale supplies from SDCWA will increase to offset reductions in local supplies and the City of San Diego will be able to meet 100% of demand. Refer to Section 4 of the City of San Diego's Draft 2015 UWMP. Source: City of San Diego Draft 2015 UWMP (27)

6.1.3 Resource Maximization and Import Minimization

The District relies on demand management to maximize use of resources. The District's demand management programs are described in Section 7.

Reducing potable water demands will help the District maximize resources and reduce imports. Using recycled water in the future for landscaping and other allowable applications will reduce the District's potable water demand, allowing the District to use its potable supply more efficiently and to reduce imported potable supply. See section 5.6 for more details on the potential use of recycled water in the District.

The District's ability to reduce imports is closely tied to the City of San Diego's supply plans. As discussed in Section 5.1, the majority of the City's supply is imported from SDCWA. Most of this imported water is delivered via the SWP and CRA from the Delta and the Colorado River, respectively. The City adopted a Long-Range Water Resources Plan (LRWRP) in 2002, which built off its 1997 Strategic Plan for Water Supply (5). The LRWRP identifies potential near-term and long-term supplies. Based on these efforts, the City has been exploring new alternative resources, including groundwater, to reduce the City's reliance on imported supply. Approximately 10 groundwater basins lie within the City's vicinity. The City is investigating several of the basins to determine their potential to provide a local yearly supply and/or to store imported or reclaimed water to provide a dry year supply. Refer to Section 6 of the City of San Diego's 2010 UWMP for a detailed discussion (5). The City's, SDCWA's and MWD's efforts to reduce imported supply will inherently help the District reduce imports.

6.2 WATER SHORTAGE CONTINGENCY PLANNING

6.2.1 Introduction

The UWMP Act requires a Water Shortage Contingency Plan to include stages of action, mandatory prohibitions and restrictions, consumption reduction methods, penalties for excessive use, a three-year minimum water supply estimate, and a catastrophic supply interruption plan.

6.2.2 Stages of Action, Mandatory Prohibitions and Restrictions, Consumption Reduction Methods, Penalties for Excessive Use

California American Water does not have the authority to enforce mandatory prohibitions and use restrictions without the approval of the California Public Utilities Commission (CPUC). As of July 13, 2009, California American Water's San Diego County District has received approval for implementing only voluntary water conservation measures. These measures are based on the CPUC's Rule No. 14.1 (Appendix B).

When water supplies are projected to be insufficient to meet average customer demand, and are beyond the control of California American Water, then California American Water can elect to use the stages of voluntary conservation in Section C of Rule No. 14.1 (Appendix B), after notifying the CPUC Water Division. If the water supply shortage requires more stringent prohibitions and restrictions, California American Water can request authorization from the CPUC to implement mandatory conservation and rationing measures from Section D of Rule No. 14.1 (Appendix B).

Upon filing with the CPUC for mandatory conservation, California American Water proposes the percent reduction or restriction in an advice letter. This allows California American Water to have the flexibility to request the necessary reduction percentage needed rather than going through multiple stages or processes. California American Water will work with other water purveyors in the region to implement a mandatory reduction percentage that is consistent with other regional reductions and necessary for the water supply/demand issues at the time. The CPUC approves the filing and the percent reduction, which then gives California American Water the authority to proceed in enforcing the restrictions.

In order to reach a 50 percent reduction, California American Water would file an immediate and urgent advice letter to the CPUC requesting approval to implement mandatory prohibitions and restrictions that may likely exceed the listed prohibitions and restrictions in the section of the current Rule No. 14.1 advice letter 772 applicable to the San Diego County District (Appendix B).

The Rule No. 14.1-SD in advice letter 772 (Appendix B), applicable to the Southern Division only, outlines stages of mandatory conservation.

6.2.3 Three-year Minimum Water Supply

The future minimum supply for the San Diego County District is equal to the driest three-year historic sequence in the history of California American Water's supply, which is shown in Table 6-4. Through its contract with the City of San Diego, the District has a right to purchase up to 120% of its average system delivery per customer per day. Since there has never been a time when demand could not be fully met with purchased water from the City of San Diego this plan assumes that the supply from the City of San Diego meets 100% of the District's demand under a three-year minimum water supply scenario.

Table 6-4 shows the three-year minimum water supplies for the San Diego County District.

Table 6-4. San Diego County District Three-year Minimum Water Supplies

Supply Source	2016	2017	2018
City of San Diego (afy) [1]	9,667	10,334	11,004

[1] The City of San Diego supply is assumed to be 100% of the District's demand. The City of San Diego is required to make up to 120% of the San Diego County District's average system delivery per customer per day available to the District for purchase.

6.2.4 Catastrophic Supply Interruption Plan

This section describes the response to emergency situations that interrupt water supply including earthquakes, regional power outages, system failures and other events specific to California American Water's sources.

California American Water has analyzed the nature and extent of likely catastrophes that could affect the ability to provide water supply for both consumption and emergency use. Catastrophes are broadly classified as "naturally occurring" and "manmade". Natural catastrophes include such incidents as fire, flood, earthquake and electrical supply failure. Manmade catastrophes include such incidents as chemical spill, vandalism and sabotage, including terrorist attack, and mechanical failure. Manmade

catastrophes can also have the same end result as those of natural disasters. As an example, a dam break, regardless of the cause, could flood and damage or destroy facilities.

California American Water has installed a broad range of systems, procedures, and facilities to reduce the potential of significant water supply interruptions regardless of cause. Some of these systems, procedures and facilities are summarized here:

- All storage facilities are fenced and locked to prevent unauthorized entry.
- The District owns a trailer mounted generator that enables it to pump water from the City of Coronado to Imperial Beach.
- System pressure, water production flow rate, and power status are monitored and reported at the District office.
- California American Water's San Diego County District maintains on-call staff twenty-four hours a day for rapid response.
- California American Water maintains a stockpile of service line repair parts and associated construction equipment for repair of small leaks and line breaks.
- California American Water has blanket contracts with two local contractors to assist with larger emergency repairs caused by earthquake or other major event.
- California American Water's San Diego County District has completed an Emergency Response Plan detailing procedures and contacts and outlining responses to several most probable catastrophic events and has filed it with the Department of Public Health.
- An inherent strength in the San Diego County District's system is that it has multiple entry point connections. As a result, the system has a high degree of redundancy.
- The San Diego County District's system has emergency interties with other adjacent water purveyors thus allowing mutual aid.

6.2.5 Revenue and Expenditure Analysis

California American Water develops a proposed rate structure and submits it to the CPUC for review and approval as part of each General Rate Case filing. These filings are usually made on a three-year cycle. To assist in revenue stabilization during periods of reduced sales, including mandatory reductions during drought, California American Water has obtained a Water Revenue Adjustment Mechanism (WRAM) in the last General Rate Case. A WRAM is the mechanism through which sales are decoupled from revenues, so that conservation is encouraged without having a negative financial impact. Currently, all of California American Water's districts, except Sacramento, have received CPUC approval for and have set up the WRAM.

A WRAM tracks the differences between total quantity charge revenues authorized by the CPUC ("Total Actual Quantity Revenues") and total quantity charge revenues actually recovered based on recorded water sales. The revenue requirements are the same under conservation rates as they would be under the previous rate structure. Implementation of a surchage/surcredit is determined by considering the net balance of the WRAM account in conjunction with a cost balancing account. The cost balancing

account tracks actual variable costs for purchased power, purchased water, and pump taxes compared to CPUC adopted levels.

6.2.6 Mechanisms for Determining Actual Reductions

In the San Diego County District, all accounts are metered. During a water shortage, a comparison of delivery records would be carried out to determine if water is being conserved.

The San Diego County District's four main connections with the City of San Diego are metered and have continuous recording equipment. During a water shortage, a comparison of total water purchased would be carried out to determine if water is being conserved on the District level.

6.2.7 Supply and Demand Comparison

Table 6-5 shows a supply and demand comparison during a normal year scenario. Table 6-6 shows a supply and demand comparison during a single dry year scenario. Table 6-7 shows a supply and demand comparison during a multiple dry year scenario.

Table 6-5. Supply and Demand Comparison- Normal Year

	2020	2025	2030	2035
Supply totals (afy)	12,355	12,735	13,127	13,531
Demand totals (afy)	12,355	12,735	13,127	13,531
Difference (afy)	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%

Table 6-6. Supply and Demand Comparison- Single Dry Year

	2020	2025	2030	2035
Supply totals (afy)	12,355	12,735	13,127	13,531
Demand totals (afy)	12,355	12,735	13,127	13,531
Difference (afy)	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%

Table 6-7. Supply and Demand Comparison- Multiple Dry-Year Events

		2020	2025	2030	2035
Multiple-dry year first year supply	Supply totals (afy)	12,355	12,735	13,127	13,531
	Demand totals (afy)	12,355	12,735	13,127	13,531
	Difference (afy)	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%
Multiple-dry year second year supply	Supply totals (afy)	12,355	12,735	13,127	13,531
	Demand totals (afy)	12,355	12,735	13,127	13,531
	Difference (afy)	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%
Multiple-dry year third year supply	Supply totals (afy)	12,355	12,735	13,127	13,531
	Demand totals (afy)	12,355	12,735	13,127	13,531
	Difference (afy)	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%

6.2.8 Draft Ordinance

California American Water does not have authority to adopt resolutions or ordinances as a public utility company. However, California American Water can support local jurisdictions in developing ordinances or resolutions within the San Diego County District's service areas that would be compatible with California American Water's Water Shortage Contingency Plan. For all intents and purposes of this UWMP, the Rule No. 14.1 advice Letter 772 filed with the CPUC (see Appendix B) serves as the Water Shortage Contingency Plan resolution and anticipated course of action to achieve all necessary requirements of the Water Shortage Contingency Plan if needed.

6.3 WATER QUALITY

The San Diego County District continues to have good water quality. In 2015, the District's water met all U.S. Environmental Protection Agency (EPA) and California State drinking water standards (28).

The San Diego County District purchases all of its water as treated water from the City of San Diego. Water delivered to the District from the City of San Diego is of good quality and meets all primary and secondary drinking water standards (3). Lead and copper levels are low, which has allowed California American Water to continue a reduced monitoring program.

Since February 2011, the City of San Diego began fluoridating all of its drinking water, including water that is supplied to the California American Water's San Diego County District. The program was approved by the California Department of Public Health (CDPH) and includes rigorous monthly reporting to CDPH. Fluoride supplements are added to the water to bring the fluoride level to 0.7 milligrams per liter, which meets the U.S. Centers for Disease Control and Prevention recommended fluoride dose (29).

The U.S. Environmental Protection Agency's Stage 2 Disinfectant/Disinfection By-Product (D/DBP) Rule requires consecutive water purveyors to ensure that delivered water meets the D/DBP MCLs. The MCLs for Total Trihalomethane (TTHM) and haloacetic acid (HAA5), both which are by-products of drinking water chlorination, are 80 parts per billion (ppb) and 60 ppb, respectively. In 2009, the measured TTHM and HAA5 levels for the District were far below the MCLs; the TTHM level was 33.2 ppb and the HAA5 level was 9.2 ppb (28). The City of San Diego uses chloramine to maintain a disinfectant residual within the distribution system, which produces less TTHM and HAA5 by-products than chlorine, and helps the District comply with the Stage 2 D/DBP Rule (3).

7 DEMAND MANAGEMENT MEASURES

The Demand Management Measures (DMM) section provides a comprehensive description of the water conservation programs that California American Water has implemented for the past five years, is currently implementing, and plans to implement in order to meet the 2020 urban water use reduction targets. The section of the CWC addressing DMMs was significantly modified in 2014, based on recommendations from the Independent Technical Panel (ITP) to the legislature. The ITP was formed by DWR to provide information and recommendations to DWR and the Legislature on new DMMs, technologies, and approaches to water use efficiency. The ITP recommended, and the legislature enacted, streamlining the requirements from the 14 specific measures reported on in the 2010 UWMP to six more general requirements plus an "other" category for measures agencies implemented in addition to the required elements. The required measures are summarized in Table 7-1.

Table 7-1. Demand Management Measures

	Measure
1	Water waste prevention ordinances
2	Metering
3	Conservation pricing
4	Public education and outreach
5	Programs to assess and manage distribution system real loss
6	Water conservation program coordination and staffing
7	Other demand management measures

The UWMP Act allows California Urban Water Conservation Council (CUWCC) members to submit their 2014-2015 approved CUWCC Best Management Practices (BMP) report with their UWMPs in lieu of, or in addition to, a DMM section if the water supplier is in full compliance with the CUWCC MOU. The District's 2014-2015 CUWCC BMP report provides a framework for future UWMPs and BMP implementation. The BMP report was not available at the time this UWMP was prepared. Additional DMM implementation information is provided in the following sections.

7.1 DEMAND MANAGEMENT MEASURES (DMMS) IMPLEMENTED OR PLANNED TO BE IMPLEMENTED

7.1.1 DMM – Water Waste Prevention

According to the DWR 2015 UWMP Guidebook, a water waste ordinance explicitly states the waste of water is to be prohibited. The ordinance may prohibit specific actions that waste water, such as excessive runoff from landscape irrigation, or use of a hose outdoors with a without a shut off nozzle.

The District does not have legal authority or ordinances as a public utility company and must obtain approval from the CPUC to implement water conservation programs, including voluntary and/or mandatory measures. In May 2015, California American Water submitted Rule 14.1 to the CPUC to define water conservation measures and the approval process that California American must follow to implement mandatory water conservation (Appendix B).

Section D of Rule 14.1 (Appendix B) defines water conservation requirements that are effective at all times until deactivated by the CPUC. These conservation requirements define non-essential uses of water and limit water waste from new developments and existing customers. Although these are considered requirements, they are voluntary and serve as the District's Voluntary Water Conservation Program. The District's Voluntary Water Conservation Program pamphlet, shown in Figure 7-1, is available online or from the District.

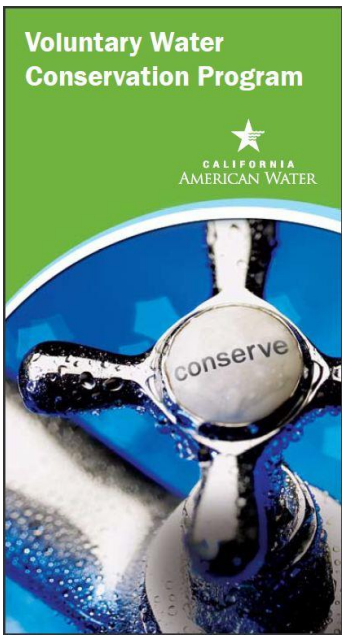

Figure 7-1. Water Conservation Program Pamphlet

Sections E through H of Rule 14.1 (Appendix B) list the specific requirements of the District's 3 mandatory conservation stages. The District must receive authorization from the CPUC before implementing mandatory conservation measures.

The mandatory conservation stages listed in Rule 14.1 shall remain dormant until the District submits a letter to the CPUC and receives authorization to declare mandatory conservation. The mandatory conservation request letter to the CPUC shall include justification for activating the particular mandatory conservation stage, as well as the expected duration the mandatory conservation will be in effect.

During 2015, the District filed Advice Letter No. 1078-B which included Stage 2 of the Water Shortage Contingency Plan for the District. Authorization was granted with an effective date of June 1, 2015. On August 25, 2015, the District filed Advice Letter 1090, requesting Stage 3 activation of its Water Shortage Contingency Plan, which restricts outdoor watering to one day per week and imposes a drought surcharge on residential customers. At the time of filing of Advice Letter 1090, the District's customers were close to the State mandated emergency water conservation regulations reduction target; therefore, the District proposed to modify the surcharge rate to 25% and 12.5% of the Tier 3 residential rate for residential and low-income customers, respectively.

7.1.2 DMM - Metering

The District is 100% metered. The District performs meter reading on a bi-monthly basis and consequently bills customers on a bi-monthly basis. All customers, with the exception of private fire connections, are billed a service charge and a usage rate/commodity charge for each unit of water consumed. The commodity charges for residential customers are based on a tiered rate structure. The commodity charges for commercial, industrial and public authority customers are based on a uniform rate structure. More details on rate structures are provided under DMM-Conservation Pricing (Section 7.1.3).

The District maintains a database to track meters and record years in service. Prior to 2010, the District had a program to test, repair, and replace water meters, per General Order No. 103 (30). The District is no longer required to carry out a regular testing program; however, the District tests specific meters if requested by a customer (31). Data on the number of meters tested and replaced per year was not available.

7.1.3 DMM – Conservation Pricing

According to the DWR 2015 UWMP Guidebook, retail water agencies need to describe the pricing structure that is used by the water agency. Conservation pricing sends a signal to customers regarding their water use. The type of rate structure used by the District for each connection type is shown in 7.1.3 and is described here:

The District plans to continue to implement this BMP, but this BMP is not expected to yield additional water savings since all connections in the District are metered.

The type of rate structure used by the District for each customer type is shown in Table 7-2 and is described here:

(1) Residential Connections: The District's water rate structure encourages residential customers to conserve water by using tiered rates. The District has a four-tiered rate structure, but the tiers and rates differ by service area (32). The tiered rate structure establishes volumetric rates; that is the more water a customer consumes, the more expensive the water becomes. In addition, the District's rates include a monthly service charge per meter depending on the size of the connection.

(2) Non-Residential Connections (except private fire): The District uses a uniform rate for commercial, public authority, and industrial customers, in which the volumetric rate is constant regardless of the amount of water consumed. In addition, the District's rates include a monthly service charge per meter depending on the size of the connection.

(3) Private Fire Connections: Private fire protection systems and private fire hydrants are charged a fixed monthly fee per hydrant or connection.

Table 7-2. Water Rate Structures

Customer Type	Water Rate Structure
Residential	Four Tier Volumetric Rate
Commercial	Single Tier Volumetric Rate
Industrial	Single Tier Volumetric Rate
Institutional/Government	Single Tier Volumetric Rate
Private Fire	Fixed

7.1.4 DMM – Public Information Programs

California American Water's San Diego District participates in a combination of community events, public meetings, outreach campaigns, bill messaging and inserts to reach out to customers and promote water use efficiency and conservation. In 2014, California American Water held community open house events that included a conservation table providing information about the District's programs and conservation advice to interested customers. One such meeting took place in the San Diego County District along with a separate CPUC Public Participation Hearing in 2014. In addition to community open house event, the San Diego County service area sent out nine bill inserts and/or newsletters in 2014 that focused on water conservation and incentive programs. These provided information on water conservation tips, home water surveys, and water conservation products available to customers. California American Water also participated in a conservation booth at the Annual Coronado Flower Show, the Coronado Fire Department Open House and the Coronado Concert in the park event. In addition, California American Water took part in the Sun and Sea Festival and Imperial Beach Day of the Dead events, hosted three Sustainable Landscape retrofit hands-on Workshops, a Landscape retrofit classroom style presentation for customers, home owners' association presentations, and sponsored the Rotary Ride and Stride Event. California American Water also expanded its internet and digital communications in 2014. A special drought page for its website was added that featured monthly updates on water use reductions for each district and a water waste reporting feature. Drought and conservation messaging was also increased through the company's Facebook page and Twitter feed.

Public Outreach and events are funded through California American Water's conservation surcharge, as well as through general rates collection as part of the operations budget. Those expenses under the conservation surcharge include educational and water saving materials, displays and informative giveaways, conservation related bill inserts and mailers, and special outreach letters to customers on the topic of water conservation. Other expenses for events and activities such as event sponsorship, Company booth fees, room fees, etc., are funded under the general operations budget under Community Relations.

In addition, the California American Water's San Diego County District has developed a partnership with the Conservation Garden at Cuyamaca College, a local nonprofit organization, for students attending schools located in the San Diego County District service area. Students are bussed to the garden and receive a lecture and tour of the garden by Pam Meisner (a.k.a. Ms. Smarty-Plants) that outlines basic water conservation principles, and specific plant and landscaping knowledge to reduce outdoor water use. Ms. Smarty Plants also does school assemblies where she hosts a school water conservation assembly, which usually addresses a number of school grades at one time with a fun, fast paced conservation "presentation". These events consistently receive excellent survey feedback from both teachers and students. In 2014, there were 10 presentations with a total of 1,710 student participants from Kinder through 4th grade. The school education program was funded by of the conservation surcharge one-way balancing account.

Figure 7-2. School Education Presentation

7.1.5 DMM –Water Loss Control

The District's four main connections with the City of San Diego are metered and have continuous recording equipment. This gives a measure of the total amount of water entering the District's system, also called the total production. All billed customer connections are metered, which allows the District to measure the total billed customer deliveries. With the total production and the total billed deliveries, the District is able to calculate the non-revenue water (NRW). In 2015, the District had approximately 99 AFY of NRW. The District has unbilled authorized consumption; thus, the total losses are less than the NRW.

The District completed training in the AWWA Water Audit Method and the Component Analysis Process (1). In 2010, the District began using the AWWA Water Loss software to analyze water losses. Figure 7-3 shows a summary of the 2014 audit.

AWWA Free Water Audit Software: Water Balance

WAS v5.0
American Water Works Association.

Water Audit Report for:	California American Water - San Diego District (37100071)
Reporting Year:	2014 1/2014 - 12/2014
Data Validity Score:	73

		Water Exported 0.000	Billed Water Exported			Revenue Water 0.000
Own Sources (Adjusted for known errors) 0.000	System Input 3,574.230	Water Supplied 3,574.230	Authorized Consumption 3,561.220	Billed Authorized Consumption 3,560.230	Billed Metered Consumption (water exported is removed) 3,560.230	Revenue Water 3,560.230
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 0.990	Unbilled Metered Consumption 0.090	Non-Revenue Water (NRW) 14.000
					Unbilled Unmetered Consumption 0.900	
			Water Losses 13.010	Apparent Losses 53.799	Unauthorized Consumption 8.936	
					Customer Metering Inaccuracies 35.963	
					Systematic Data Handling Errors 8.901	
Water Imported 3,574.230				Real Losses -40.789	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

Figure 7-3. AWWA Water Balance for 2014, Volumes are in Million Gallons per Year (33)

The District repairs all leaks upon notification (34). Notification can come from the public or from internal staff who have located a leak in the system. The District is in the process of developing a statewide policy for water loss and leak detection. In addition, the District provides leak detection information and assistance to its customers through providing educational tools and giveaways, such as dye tablets, to detect leaks. This is discussed under Section 7.1.4.

7.1.6 DMM – Conservation Coordinator and Staffing Support

In 2014, California American Water's San Diego County District funded one full-time Conservation Intern position. The conservation intern conducted residential water surveys and supported the administration of the conservation program by responding to customer inquiries, conducting conservation patrols, staffing public outreach conservation events, tracking equipment inventory, assisting customers with rebate applications, and reaching out to customers to publicize all the programs available to them. The Intern also conducted turf removal rebate pre- and post-inspections at customer sites. The conservation intern was funded out of the conservation surcharge one-way balancing account.

In addition, a Conservation Specialist in the Company's Los Angeles office oversees the Conservation reps in San Diego, Ventura and Los Angeles with the Manager of Field Operations overseeing all of the State's Conservation program. Most conservation related customer requests and inquiries are being received via the local conservation hotline in each district or through local customer service staff transferring a request to conservation. The remaining requests coming through the central call center. The local conservation staff are the primary customer contact and responders to all conservation related inquiries including the distribution of water conserving devices and processing rebate applications. Operations personnel assist with collecting production and sales data, water loss reduction efforts, staffing local events, and coordinating with staff from cooperating agencies.

7.2 OTHER DEMAND MANAGEMENT MEASURES

The District is committed to implementing cost effective programs that will increase water efficiency District wide. Though not required, the District has implemented the following demand management measures during the past five year and will continue implementation into the future in order to increase the overall water efficiency of the District's customers. The following sections describe the measures in terms of the CUWCC Memorandum of Understanding Best Management Practices (BMP).

7.2.1 Residential Water Audits – CUWCC BMP 3

California American Water's-San Diego County District performed 48 residential water surveys in 2014 in-house by its own conservation staff, saving up to $400 per survey and providing a personal and unique customer experience, which repeatedly received highly positive customer feedback. 44 surveys were contracted out in 2014 due to scheduling conflicts or greater demand that could not be handled by in house staff in a timely manner. The contracted out surveys were conducted by WaterWise Consulting Services, Inc., AquaSave or BlueWatchDog Conservation, Inc. All audits included a detailed assessment of the indoor and outdoor usage, an individualized water budget, recommended monthly irrigation schedule, as well as a comprehensive audit package with applicable water saving devices, (water and energy) rebate application forms, and educational material. All audit data and information is collected and maintained in a database to allow for easy tracking of water saving opportunities and to obtain a district profile for toilets and other water saving devices.

The costs for the survey vendors were funded out of the conservation surcharge one-way balancing account. Expenses for the conservation devices and materials are included in the following Residential Plumbing Retrofit section of this report.

7.2.2 Residential Plumbing Retrofit – CUWCC BMP 3

California American Water provides customers various water saving devices including showerheads, faucet aerators (kitchen and bathroom), toilet leak detection tablets, garden hose spray nozzles and automatic hose shutoff timers, soil probes, and educational pamphlets. These devices and informative materials are designed to help residential customers upgrade their indoor water use fixtures, identify leaks, and improve outdoor water usage for car washing and irrigation. The devices and material are provided to customers upon request at community events and meetings, office walk-ins, customer call-ins, and through the home water survey program.

The residential plumbing retrofit program was funded out of the conservation surcharge one-way balancing account.

California American Water provides customers various water saving devices including showerheads, faucet aerators (kitchen and bathroom), toilet leak detection tablets, garden hose spray nozzles, soil probes, and educational pamphlets. These devices and informative materials are designed to help residential customers upgrade their indoor water use fixtures, identify leaks, and improve outdoor water usage for car washing and irrigation. The devices and material are provided to customers upon request at community events and meetings, office walk-ins, customer call-ins, and through the home water survey program.

The residential plumbing retrofit program was funded out of the conservation surcharge one-way balancing account.

Table 7-3 summarizes the devices were provided to customers in 2014:

Table 7-3. Residential Plumbing Retrofit Summary

Name of measure, as listed in Decision or Settlement	# of units / activities Bought	$ per unit, activity, etc.	Total $ spent 2014	Estimated water savings per unit per year	Unit lifespan	Estimated Annual measure savings (AFY)	Estimated Lifetime measure savings (AF)
Showerheads	997	$4.72		0.0062	5	6.18	30.9
Faucet Aerators	1,402	$0.55		0.0017	5	2.38	11.9
Toilet Flappers	119	$1.88		0.0047	5	0.56	2.8
Tankbanks	479	$1.25		unknown	5	unknown	unknown
Drip Gauge	351	$0.28		unknown	5	unknown	unknown
Leak Detection tablets	1154	$0.06		0.0007	5	0.81	4.0
Shower Timers	1210	$1.69					
Measuring Bag	872	$0.12		unknown	-	unknown	unknown
Hose spray nozzle	587	$3.37		unknown	5	unknown	unknown
Soil Probe	405	$2.50		unknown	5	unknown	unknown
Hose Timer	551	$7.48		unknown	5	unknown	unknown
Total			$15,979	-		9.93	49.66
Total spent $ represents purchased items during 2014 – this does not equal total of items provided during the year							

7.2.3 Residential Turf Rebate Program – CUWCC BMP 3

California American Water's San Diego County District started a residential turf removal rebate program in 2012 and has continued to offer such rebates throughout 2014. The program offered qualified customers a rebate of $1 per square foot of replaced turf for a maximum of 1,500 square feet per customer. In order to qualify for the program, a customer needed to have a residential water survey completed plus California American Water staff would perform a pre- and post-inspection of the customer's landscaped area to assure compliance with all rebate requirements. A number of requirements had to be met in order to be considered for the rebate. Among such requirements were an operational in ground irrigation system with existing living turf that had been regularly irrigated at time of application, conversion of the retrofitted area to drip or micro spray irrigation, and the requirement that the retrofitted site had to be maintained for a minimum of 5 years. In 2014 9 customers in the San Diego County District qualified for and received a turf replacement rebate totaling 12,699 square feet of turf being removed. The program was funded out of the conservation surcharge one-way balancing account.

7.2.4 Residential and Commercial Rebates (CUWCC $mart Rebates, MWD's SoCal Water Smart, California American Water in-house rebates) – CUWCC BMP 3 & 4

California American Water-San Diego County District has for a number of years, partnered with the California Urban Water Conservation Council to provide the grant-funded Smart Rebate program to residential and commercial customers. Rebated items for residential customers included high-efficiency clothes washers (HECW's) and high-efficiency toilets (HET's); rebated items for commercial customers included HEW's, HET's, high-efficiency urinals (HEU's), pressurized waterbrooms, and x-ray film processor re-circulation systems. The Smart Rebate Program was co-funded by California American Water and Proposition 50 Water Use Efficiency grant funding through the Department of Water Resources (DWR) in January 2009 providing incentives to customers at much reduced costs to the utility. California American Water's share of the co-funding for the Smart Rebates, however, has been depleted since late 2011 and the program has since continued as a "stand alone" program, still administered through CUWCC, but now fully funded by the utility. CUWCC's administrative cost charged to California American Water per issued rebate is greater than $50 regardless of the rebate amount. Due to this significant cost, California American Water in 2012 implemented an in-house rebate program administered by its own staff eliminating any additional costs to the program. Funding for the program comes from the conservation surcharge account. CUWCC's agreement with California American Water has been extended to allow for the depletion of existing program funding but is set to expire sometime in 2015. Until that date, CUWCC's Smart Rebate program runs essentially parallel to California American Water's in house rebate program, however, participation levels of customers in the Smart Rebate program has been minimal in 2014 except for the funding of the guest room toilet retrofit at the Marriott Coronado hotel, which included retrofitting all 300 guest rooms with High Efficiency Toilets and was completed in May of 2014. California American Water has strict controls in place to prevent customers from applying for both programs to get multiple rebates for the same appliance or toilet. Rebate amounts in San Diego matched the CUWCC's rebate offerings.

7.2.5 CII & Large Landscape Audits – CUWCC BMP 4 & 5

California American Water's San Diego County District offers free CII and large landscape ("LL") audits to non-residential customers. CII audits include a detailed onsite audit evaluating the facility, water use patterns, indoor water use, and summary of recommendations specific to the property. LL audits include a detailed outdoor audit and the creation of a site-specific water budget and irrigation schedule. California American Water has signed agreements with three different vendors that provide CII and LL survey services. The vendors are WaterWise Consulting, AquaSave and BlueWatchDog Conservation. Having such a portfolio of vendors allows the Company to best use their individual expertise depending on site and customer requirements. A primary focus in 2014 for CII and LL surveys was to increase survey efficiencies by increasing the number of survey customers that were willing to implement significant retrofits per the survey recommendations. Non-residential survey participants in the past had often been hesitant to implement some of the (often costly) water efficiency or irrigation retrofits recommended in the report. As a result, California American Water worked together with BluewatchDog to develop a web based monitoring tool as a follow up process to surveys. The program, Bluedashboard, is essentially a tracking tool for water usage for both, customer and utility. A (voluntary) water budget is established during a survey reflecting appropriate indoor and/or outdoor water requirements for a customer. The budget is entered into the monitoring tool and monthly post survey water usage is measured against the established budget. If a customer's monthly usage significantly exceeds his budget for that particular month, California American Water's conservation staff or the survey vendor will contact the customer and discuss potential issues regarding the high use. The program so far has been very successful and has received very positive feedback from participating customers. The program primarily helps with creating a commitment from survey customers to follow up after a survey is conducted and re-evaluate water efficiency practices rather than falling back to the previous status quo of water usage. As an added measure to achieve maximum water savings from surveys, California American Water also changed its "protocol" for the set-up of CII and LL surveys; before such survey is conducted, the utility, vendor and customer agree on an in person "kick off" meeting with key staff from all three parties present. The meeting identifies decision makers for retrofit or budget decisions and establishes commitment from the customer to implement some or all of the survey recommendations or, at the minimum, do necessary leak and other repairs, if applicable, to improve efficiency. A similar follow up meeting is scheduled with the same participants after the survey is completed to discuss results and further steps. This approach has proven to be highly effective, has led to a much closer customer-utility partnership for water efficiency improvements, and has further led to some significant capital investments from customers for improved water efficiency measures even beyond survey recommendations. In 2014, San Diego completed 2 CII audits and 11 LL audits.

The non-residential water audit program was funded out of the conservation surcharge one-way balancing account.

7.2.6 CII & Landscape Upgrade Grant Program – BMP 4 & 5

The Landscape Upgrade Grant Program provides funding for landscape retrofit and turf removal projects to Institutional, Public and School properties. California American Water solicited grant proposals from a number of cities and schools and selected a proposal from the City of San Diego to receive grant funding. The proposals had to include specific landscape retrofit plans including plant lists, irrigation maps, water savings calculations, project schedule, and explanations on how the retrofitted area would be used for educational purposes and how it would be maintained. The selected retrofit site was Montgomery Waller Park in South San Diego – on of the largest parks in the area. The project was designed as a community engagement project and was assisted with volunteer work from the City of San Diego, Surfrider Foundation and California American Water customers who volunteered. A Hands-on Sustainable Landscape workshop was designed around the retrofit at Montgomery Park so that interested customers could learn over the course of 4 Saturdays how to remove turf, prepare the soil and plant a California native plant garden. The retrofit was featured in the local press and a time lapse video of the transformation was filmed. The site received $21,815 in grant funding.

Figure 7-4. Landscape Workshops

The Landscape Upgrade Grant Program was funded out of the conservation surcharge one-way balancing account.

8 CLIMATE CHANGE

California's Global Warming Solutions Act of 2006 (AB 32) recognized climate change as a "serious threat to the economic well-being, public health, natural resources, and the environment of California" (35). Potential adverse impacts listed include sea level rise and reduced quality and supply of water from the Sierra snowpack (35). Following the passing of AB 32, city and county general plans, California Environmental Quality Act (CEQA) documents, and Integrated Regional Water Management Plans (IRWMPs) must consider climate change.

The 2015 UWMP Act and 2015 UWMP Guidebook do not require climate change considerations in UWMPs, but do recommend considering IRWMP climate change objectives in the UWMP if applicable and available (36). Recognizing that the impact of climate change on urban water systems is uncertain but potentially significant, mitigation and adaptation strategies are presented here to move towards reducing climate change impacts on the District.

8.1 VULNERABILTY ASSESSMENT

Assessing climate change vulnerability is an important step to inform sustainable water management strategies. Climate change vulnerability is the susceptibility to harmful impacts due to climate change, and the degree of vulnerability is used to identify management actions that have the potential to reduce negative consequences. The vulnerability assessment checklist presented below highlights those water-related resources that are important to the region and are sensitive to climate change. The following checklist comes from the Climate Change Handbook for Regional Water Planning (37) as recommended in the DWR's *Guidebook to Assist Water Suppliers in the Preparation of a 2015 Urban Water Management Plan (UWMP Guidebook)* (38). The issues summarized in the checklist below are only issues relevant to the District from the water demand, supply, and sea level rise sections. The entire checklist is included as Appendix H.

Does water use vary by more than 50% seasonally in parts of your region?
Seasonal water use, which is primarily outdoor water use, is expected to increase as average temperatures increase and droughts become more frequent. The summer and winter water demands in this area vary by more than 25%, and irrigation water varies by over 50% from summer to winter.

Are water use curtailment measures effective in your region?
Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts. California is currently experiencing the worst drought in its history and the San Diego County District, along with all water supplier in the state, have curtailment measures in effect.

Does a portion of the water supply in your region come from snowmelt?
Snowmelt is expected to decrease as the climate warms. Water systems supplied by snowmelt are therefore potentially vulnerable to climate change. The San Diego County District purchases all of their water from The City of San Diego, with supplies from the State Water Project, Colorado River, and local runoff/reserves. The State Water Project is the only source that relies on snowmelt, and as the climate warms less State water Project will be available.

Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?
The San Diego County District purchases all of their water from the City of San Diego, whose supplies come from the State Water Project, Colorado River Aqueduct, and local runoff/reserves. The State Water Project diverts water from the Delta and the Colorado River Aqueduct diverts from the Colorado River. These climate sensitive areas may be more vulnerable to climate change, and as the climate warms, less water may be available for diversion.

Would your region have difficulty in storing carryover supply surpluses from year to year?
Droughts are expected to become more severe in the future. Systems that can store more water may be more resilient to droughts. The San Diego County District would have difficulty storing surplus supplies because they do not have a local reservoir or potential for groundwater storage.

Has coastal erosion already been observed in your region?
Coastal erosion is expected to occur over the next century as sea levels rise. The San Diego County District is located along the Pacific Coast and coastal erosion has been observed in this region.

Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?
Coastal flooding will become more common, and will impact a greater extent of property, as sea levels rise. Critical infrastructure in the coastal floodplain may be at risk. There are many low-lying areas that include residential homes in the District's service area that are less than six feet above mean sea level.

Are there climate-sensitive low-lying coastal habitats in your region?
Low-lying coastal habitats that are particularly vulnerable to climate change include estuaries and coastal wetlands that rely on a delicate balance of freshwater and salt water. The San Diego County District service area encompasses a large coastal area, including part of the Tijuana estuary, that is sensitive to climate change.

Are there areas in your region that currently flood during extreme high tides or storm surges?
Areas that are already experiencing flooding during storm surges and very high tides, are more likely to experience increased flooding as sea levels rise. Some locations in the San Diego County District service area with very low elevation are at risk of flooding during high tides and have potential for increased risk with sea level rises. Currently the community has taken precautions to prevent coastal flooding including installing rip rap on their coastal property, but should prepare for increased severity of coastal storms.

Do tidal gauges along the coastal parts of your region show an increase over the past several decades?
Local sea level rise may be higher or lower than state, national, or continental projections. NOAA tide and currents data show that in San Diego there is an average sea level rise of 2.13 mm/year, which is slightly above the global average of 1.6-1.7 mm/year.

8.2 MITIGATION

Mitigation is the action of taking steps to reduce further contribution to climate change by reducing greenhouse gas (GHG) emissions associated with the energy used to collect, treat and distribute water. GHG emissions generated during water production can be reduced by reducing energy use, increasing energy efficiency, and/or substituting renewable energy sources for fossil fuel based energy sources. In the water sector, reducing energy use is the primary way to mitigate climate change (36).

Energy is required to move, treat, use, and discharge water; thus, decreasing water use leads to a reduction in overall energy use. An estimate of the energy used for pumping and treating water is carried out in Section 8.2.1 to illustrate potential energy and related GHG reduction strategies.

8.2.1 Energy Intensity Estimate

AB 32 requires a statewide reduction of GHG emissions to 1990 levels by 2020. In turn, these reduction requirements are passed on to the largest generators of GHGs within the energy production, construction, transportation and industrial sectors. As a consumer of energy, the mandatory emission reductions required under AB 32 do not specifically apply to California American Water; however, the District has assessed its water energy intensity to establish a benchmark for analyzing existing and future supply and demand management and policy decisions.

DWR's Voluntary Energy Intensity Tables from Appendix O of the 2015 UWMP Guidebook were used to estimate energy intensity, which is " the total amount of energy expended by the Urban Water Supplier on a per acre-foot basis to take water from the location where the Urban Water Supplier acquires the water to its point of delivery" (38). The District purchases 100% of the water it supplies from The City of San Diego. This analysis does not include embedded energy that was added to the water upstream of the District, and only energy the District used for water distribution. This includes energy at the interconnection with The City of San Diego supply and energy used in a single storage tank, but not the energy used at the District office. Table 8-1 summarizes the energy intensity of deliveries in 2015 including the total water delivered and the total energy consumed in treatment and distribution.

Table 8-1. Energy Intensity Estimate

	Total Utility
Volume of Water Entering Process (AF)	*9,397*
Energy Consumed (kWh)	*2,913*
Energy Intensity (kWh/AF)	*0.3*

The energy intensity calculation shows the District only uses 0.3 kWh of electricity per acre-foot of water it supplies, a relatively low value compared to other water suppliers that extract, treat, and pump local supplies. This is because the water supplied has already been extracted, treated, and is pressurized and ready for distribution.

Energy intensity reporting provides many strategies and benefits for water utilities and their customers for improving energy efficiency including:

- Identifying energy saving opportunities as energy consumption is often a large portion of the cost of delivering water.
- Calculating energy savings and greenhouse gas (GHGs) emissions reductions associated with water conservation programs.
- Potential opportunities for receiving energy efficiency funding for water conservation programs.
- Informing climate change mitigation strategies.
- Benchmarking of energy use at each water acquisition and delivery step and the ability to compare energy use among similar agencies.

Looking ahead at future scenarios of energy intensity provides insight into climate change mitigation and adaptation strategies. The District will use and update the data from Table 8-1 as necessary to achieve many of the aforementioned strategies and benefits through future water conservation, supply portfolio management and various other management and policy measures.

8.3 ADAPTATION

While the exact effects of climate change are uncertain, climate change will undoubtedly impact the District over the long term. For example, DWR expects that climate change will affect water demand, water supply and quality, sea level, and frequency of natural disasters statewide (36). DWR recommends that water agencies consider the following climate change effects when establishing long-term plans, as shown in Table 8-2 (36):

Table 8-2. Potential Effects of Climate Change on Water Systems

Climate Change	Potential Effect on Water System
Hotter days and nights, longer irrigation season, increase in landscaping water needs, increased cooling water needs for power plants and industrial facilities	Increased water demand
Reduced snowpack, earlier spring runoff, increased potential for algal bloom	Reduced or compromised supply (lower water quality)
Sea level rise, more extreme tides	Compromised supply; Stress on levees near sea; increased potential for seawater intrusion
Increased frequency and severity of natural disasters (including droughts, floods, wildfires)	Larger variability in supply; Increased stress on infrastructure

In the California Water Plan Update 2009, DWR considers 12 different climate change scenarios to predict water demand changes for three growth scenarios (39). Each climate change scenario has separate estimates of future precipitation and temperature. When climate change is considered, all three growth scenarios showed higher annual water demands than under a repeat of historical climate (39).

8.3.1 Adaptive Management

The effects of climate change on the District are difficult to predict due the complexity of factors, including the uncertainty in future temperature, the District's close proximity to the ocean and the District's reliance on imported water that is transported through multiple water agency systems. Dealing with uncertainties like these requires an approach that is both flexible and robust. The recommended method to adapt to climate change effects on water systems is adaptive management. While adaptive management has been used in traditional water supply planning (40), it is also capable of integrating climate change uncertainties into water system management. The goal of adaptive management is to, "embrace uncertainty, accepting partial understanding of processes, and producing policies and designs that are less sensitive to the unexpected" (40).

Adaptive management is a continuous cycle consisting of four steps: (1) plan, (2) act, (3) monitor, and (4) evaluate, as shown in Figure 8-1 (40).

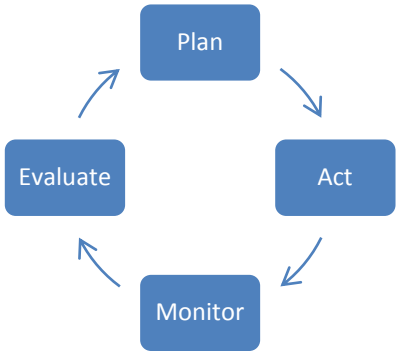

Figure 8-1. Adaptive Management Process

Evaluation results feed back into planning and the iteration process continues, yielding a closed-loop management process. This framework encourages future decisions that are based on actual results.

Table 8-3 shows four possible climate change effects that could impact the District and how the adaptive management process could be used to respond to them.

As the District encounters climate change impacts, employing the adaptive management process allows the District to manage these impacts on a continuous basis by evaluating alternatives, testing hypotheses, determining causes, and incorporating results into planning.

Table 8-3. Adaptive Management Scenarios

Example	Plan	Act	Monitor	Evaluate
Sea Level Rise	Sea level rise could cause seawater intrusion into Delta (breach levees), which could reduce SWP supply and quality; Identify ways to reduce potable water demand	Partner with cities to pursue delivery of reclaimed water to the District to be used for irrigation to reduce potable water demand	Evaluate feasibility, reliability and cost-effectiveness of reclaimed water	Determine if reclaimed water infrastructure is feasible for District; Use results to plan for future
Reduced snowpack	Less snow and more rainfall could result in increased spills out of Delta in winter and reduced SWP supply in summer and fall; Identify sources of supply less dependent on climate	Secure desalinated water supplies or partner with other agencies to pursue desalination	Evaluate reliability and cost-effectiveness of supply	Determine if desalinated water is a preferred long-term supply alternative; Use results in long-term supply planning
Flood in Delta	Island flooding could reduce SWP exports; Identify other sources of supply, including water transfers	Pursue water transfers through MWD	Evaluate feasibility, reliability and cost-effectiveness of alternative supplies	Determine whether long-term agreements for water transfers are feasible and reliable; Use results to plan for future floods
Increased Temperature & Demand	Identify and predict periods of increased temperature; Develop potential alternatives to increase supply and/or decrease demand	Implement potential alternatives (e.g. implement water conservation programs, secure other sources of supply)	Collect data on success of water conservation programs; Monitor cost-effectiveness of chosen alternative supplies	Determine if increased demand was caused by increased temperatures or other factors; Use results to plan for future periods of high temperature

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APPENDIX A. BASELINE DAILY PER CAPITA USE MEMORANDUM

Technical Memorandum

Date: 5/26/2016

To: Mark Reifer, P.E.
California American Water
8657 Grand Ave.
Rosemead, CA 91770

Phone: (626) 614-2517

Prepared by: Spencer Waterman

Project: 2015 Urban Water Management Plan for the Southern Division- San Diego County District

SUBJECT: **BASELINE DAILY PER CAPITA WATER USE UPDATE**

This memorandum presents the procedure used by California American Water's Southern Division San Diego County District to meet the requirements of Senate Bill x 7-7 (SB7) as defined in the Water Conservation Act of 2009 as incorporated into Division 6 of the California Water Code, commencing with Section 10608 of Part 2.55.

Background

On November 10, 2009, Governor Arnold Schwarzenegger signed Senate Bill x 7-7 into law. The legislation requires all water suppliers to achieve a reduction in per capita water use of 20% by December 31, 2020, with an interim target of 10% reduction by December 31, 2015. The legislation requires each urban water supplier to develop, and include in its Urban Water Management Plans (UWMPs), estimates of: 1) *baseline* daily per capita water use; 2) daily per capita water use *target*; 3) daily per capita water use *interim target*; and 4) *compliance* daily per capita water use. The UWMP must also include bases for determining the estimates, with references to supporting data. However, SB 7 did not include a detailed description of the allowable methodologies for determining the required values. Instead, it required California Department of Water Resources (DWR) to develop appropriate methodologies and criteria, and to make them available to water suppliers no later than October 1, 2010. In consideration of this delay, the bill extended the deadline for adoption of the 2010 UWMP to July 1, 2011.

In connection with preparation of California American Water's San Diego County District 2010 UWMP update, California American Water hired Water Systems Consulting, Inc. (WSC) to develop the required estimates described by SB 7. The San Diego County District is a single service area. Consistent with the requirements outlined in DWR's *Guidebook to Assist Urban Water Suppliers to Prepare a 2015 Urban Water Management Plan*, compliance is calculated for the District as a whole. To facilitate completion of the 2010 UWMP project by July 1, 2011 California American Water directed WSC to apply methodologies consistent with those described in the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use guidebook (Methodologies Guidebook). The selected procedure used to develop the required SB7 estimates includes the following basic steps:

1. Calculate baseline water use, which is the average gross daily water use per capita, reported in gallons per capita per day, based on gross water use and service area population for a continuous 10-year period ending no earlier than December 31, 2004
2. Calculate urban water use target using one of the four methods described below
3. Check and confirm the urban water use target using the five-year running average
4. Calculate the interim urban water use target (equal to the average of the baseline and confirmed urban water use target)
5. Calculate the compliance daily per capita water use (equal to the gross daily water use per capita during the final year of the reporting period (i.e. 2010))

DWR allows the urban water supplier to choose one of four different methods to calculate the urban water use target in Step 2 above.

- Method 1 involves calculating the target based on 80% of baseline daily per capita water use and the interim target based on 90% of the baseline daily per capita water use.
- Method 2 was not used for various reasons. Method 2 involves calculating the per capita daily water use by using the sum of performance standards applied to indoor residential use, landscaped area water use, and commercial, industrial, and institutional uses.
- Method 3 calculates the water use target as 95% of the applicable state hydrologic region target as stated in the draft 20x2020 Water Conservation Plan. California American Water's service areas are located in the Sacramento hydrologic region number 5 as defined in the State's 20x2020 Water Conservation Plan.
- Method 4 is an approach developed by DWR and it uses a spreadsheet to calculate estimated water savings factors to estimate targets.

Gross Water Use

SB 7 defines gross water use as:

> *"The total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following: (1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier; (2) The net volume of water that the urban retail water supplier places into long-term storage; (3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.; (4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24."*

Purchased water is the only source of water in California American Water's San Diego County District. From 1998 through the present, California American Water has not stored any water long-term or sold any water to other agencies. Therefore, gross water use is simply the total water purchased by California American Water.

Populations

The population estimates for California American Water's service areas were calculated using DWR's online Population Tool, which utilizes Geographical Information Systems (GIS) service area boundaries, service connection data and Census data. The DWR Population Tool overlaps GIS shapefiles with Census populations by Census block for 1990, 2000 and 2010. The calculated population of each block within California American Water's service area is summed up to provide populations for 1990, 2000, and 2010. Populations are divided by the total service connections in each respective census year to come up with a persons per connection factor for the purposes of projecting populations from 2010-2015. Linear interpolation was used to determine the population for years in between the census years. In 2010, there were approximately 13,888 census blocks within the San Diego County District. Figure 1 shows the 2010 census blocks in relation to California American Water's service area boundaries.

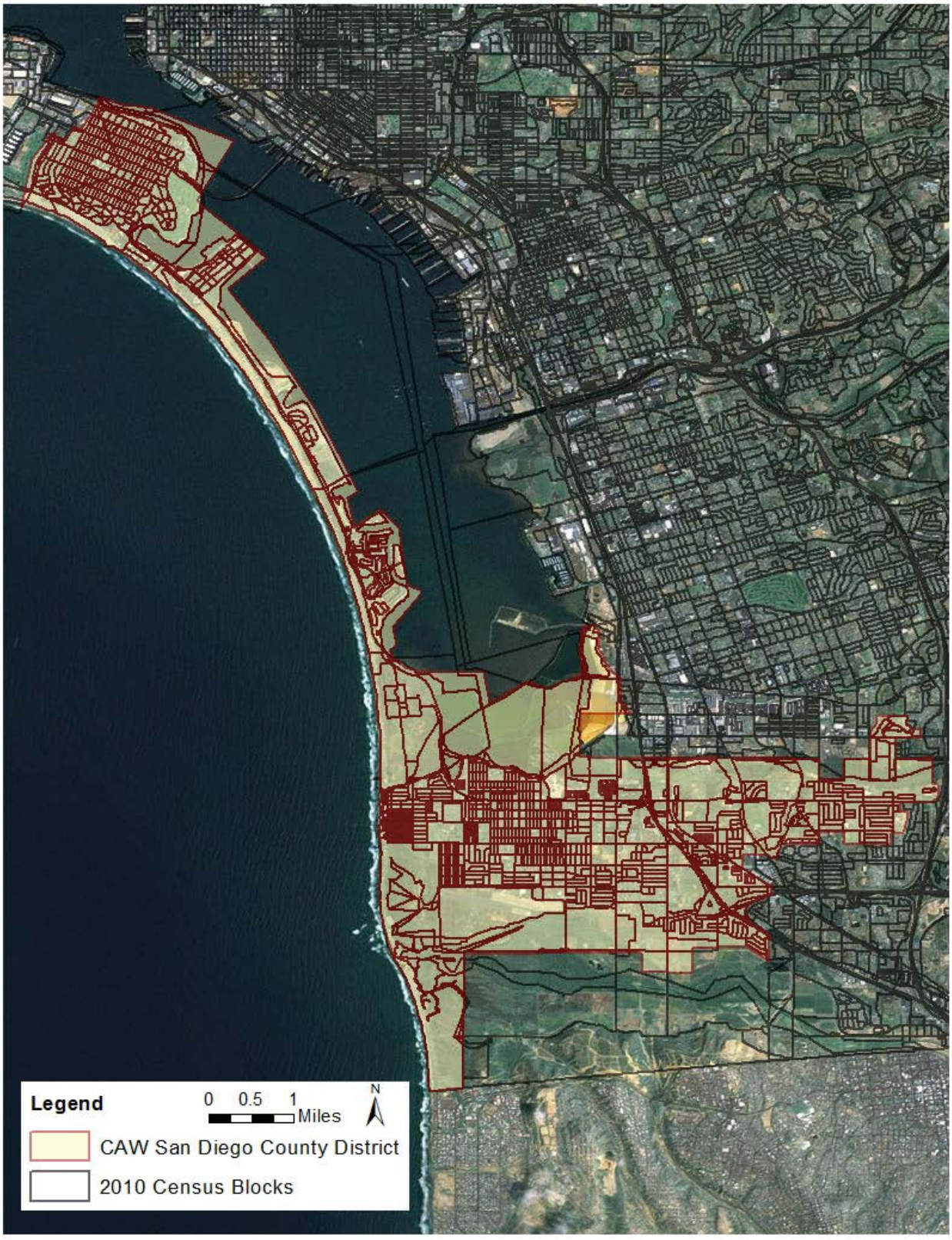


Figure 1. California American Water Service Area Boundaries with 2010 Population Data

Baseline Per Capita Water Use

WSC calculated per capita water use using gross water use values and the population estimates shown in Table 1. The annual per capita water use value was averaged across 10-year periods ranging from 1998-2007 through 2001-2010. Figure 2 shows the historical population, along with the annual per capita water use for the years 1998 through 2010.

Table 1. Baseline Daily Per Capita Water Use

Calendar Year	Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)	10 year running average (gpcd)
1995	95,115	n/a	n/a	
1996	95,567	0.0	0	
1997	96,019	0.0	0	
1998	96,472	11.3	117	
1999	96,924	12.2	126	
2000	97,376	12.5	128	
2001	97,174	11.4	117	
2002	96,973	11.0	114	
2003	96,771	11.3	117	
2004	96,569	12.3	128	
2005	96,368	11.3	118	96
2006	96,166	12.1	126	109
2007	95,964	11.6	121	121
2008	95,762	11.2	117	121
2009	95,561	10.4	108	119
2010	95,359	10.0	105	117
Base Daily Per Capita Water Use				**121**

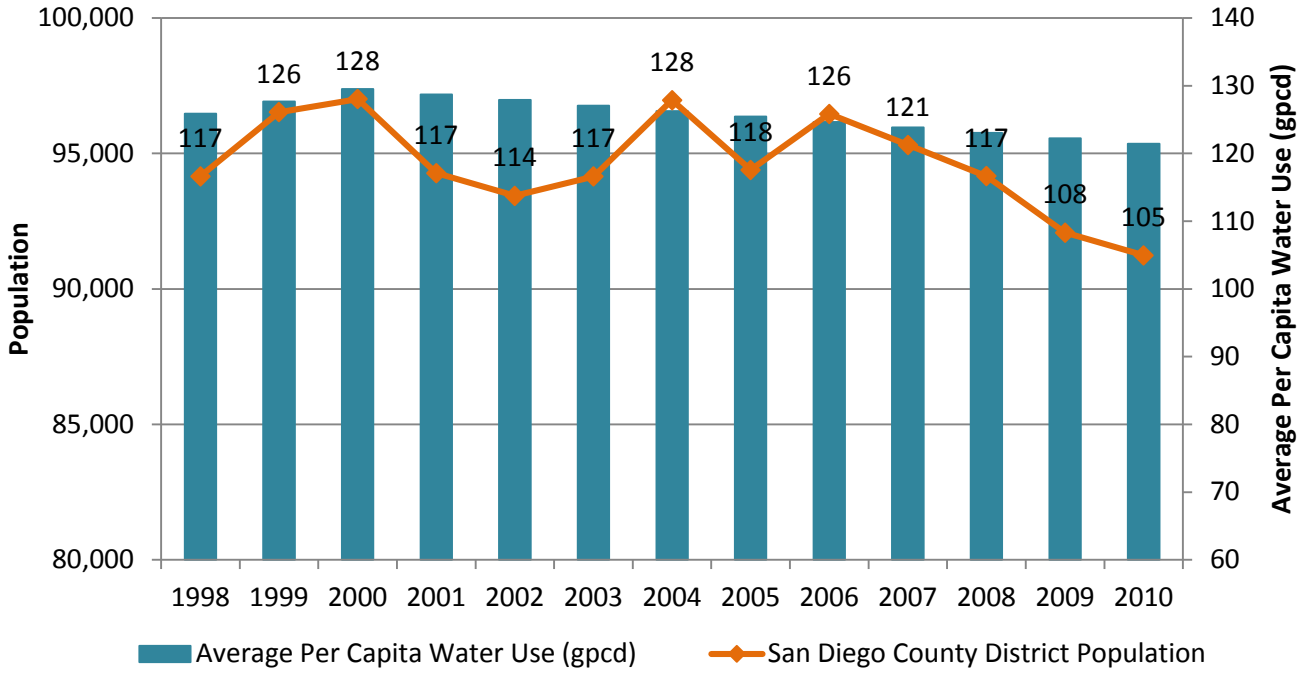


Figure 2. Historical Population and Per Capita Water Use for the San Diego County District

Water Use Targets

The per capita water use target estimates are calculated using Method 1, Method 3, and Method 4 from the Methodologies Report. Table 2 shows the estimated daily per capita water use targets for each method analyzed.

Table 2. Daily Per Capita Water Use Targets

Calculation Method	Water Use Target (gpcd)
Method 1: 80% of Baseline Per Capita Water Use	97
Method 2: Performance Standards	Not calculated
Method 3: 95% of Regional Target	142
Method 4: DWR Approach	98
Selected Urban Water Use Target	**142**

Minimum Water Use Reduction Requirements

The selected target must be less than 95% of a selected five-year running average ending no earlier than December 31, 2007 and ending no later than December 31, 2010 per the requirements of California Water Code Section 10608.22. Table 3 shows the five-year running averages, with the selected 5-year running average of 122 gpcd. Table 4 shows that the selected target from Table 2 does not meet the minimum water use reduction requirement; that is, the selected target of 142 gpcd is not less than 95% of 122 gpcd. Thus, the confirmed water use target must be set to 95% of 122 gpcd, which is equal to 116 gpcd. Table 5 shows the final baseline, compliance, interim target, and target per capita water use. Table 6 shows the status of meeting the interim target and target based on current compliance per capita water use. The values shown will be reported in California American Water's 2010 San Diego County District UWMP.

Table 3. Minimum Water Use Reduction

Calendar Year	Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)	5 year running average
2003	96,771	11	117	
2004	96,569	12	128	
2005	96,368	11	118	
2006	96,166	12	126	
2007	95,964	12	121	122
2008	95,762	11	117	122
2009	95,561	10	108	118
2010	95,359	10	105	115
Base Daily Per Capita Water Use				**122**

Table 4. Target Confirmation

Parameter	Value
Selected Urban Water Use Target (gpcd)	142
95% of 5-year Base Daily Per Capita Water Use (gpcd)	116
Selected Urban Water Use Target < 95% of 5-year Base GPCD	No
Confirmed Urban Water Use Target (gpcd)	**116**

Table 5. Baseline, Compliance, Interim Target, and Target Water Use

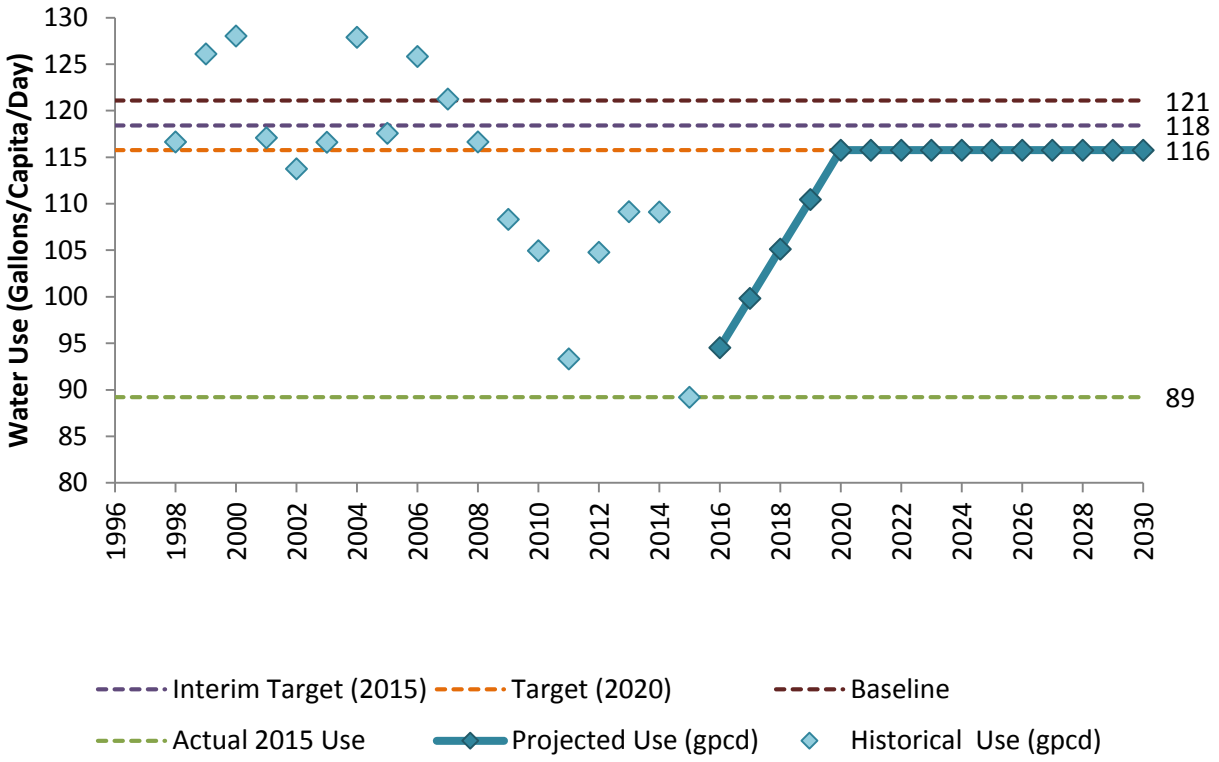
Parameter	Water Use (gpcd)
Base Daily Per Capita Water Use	121
2015 Actual Daily Per Capita Water Use	89
2015 Interim Urban Water Use Target	118
2020 Urban Water Use Target	116

Table 6. Water Use Reduction Status

Water Use Reduction (on gpcd basis)	% Reduction[1]
Achieved by 2015	26%
Needed to meet 2015 target	-33%
Needed to meet 2020 target	-30%
[1] A negative % means the compliance is currently lower than the target.	

Figure 3 shows the historical, baseline, targets, compliance, and projected per capita water use for the San Diego County District.

Figure 3. Historical Per Capita Water Use, Baseline, and Targets



APPENDIX B. CPUC RULE 14.1

SUPPLEMENT

Schedule No. 14.1. - SD
WATER SHORTAGE CONTINGENCY PLAN
SAN DIEGO DISTRICT

(C)

A. APPLICABILITY

1. This schedule applies to all water customers served under all tariff schedules authorized by the Commission for San Diego District. It is only effective in times of implementation of the Water Shortage Contingency Plan enforcement stages, as required by Rule No. 14.1, and only for the period noted in the Special Conditions section below.

2. This Schedule shall remain dormant until activated by Commission authorization via a Tier 2 advice letter.

3. Once the Schedule is activated, utility can implement Stages of the Schedule by filing a Tier 2 advice letter

4. When this schedule is activated, it shall remain in effect until the utility files a Tier 1 advice letter to deactivate a specific stage of the Water Shortage Contingency Plan and such is authorized by the Commission.

B. TERRITORY

1. This Schedule applies to all customers in the San Diego district. All other customers served by California-American Water Company are excluded from this particular tariff, but are included in separate and distinct Water Shortage Contingency Plans.

C. STAGES

1. Stage 1 of the Water Shortage Contingency Plan enacts water conservation requirements established in Rule 14.1 Section D. The non-essential or unauthorized water uses in Section D are in effect at all times.

2. Stage 2 First Enforcement Stage of the Water Shortage Contingency Plan - A Stage 2 Water Shortage Contingency Plan condition exists when it is determined that due to drought or other water supply conditions, a water supply shortage or threatened shortage exists and a further consumer demand reduction is necessary to make more efficient use of water and appropriately respond to existing water conditions. Stage 2 of the Water Shortage Contingency Plan will be enacted upon a determination that water usage should be further reduced from current levels, that a temporary water emergency exists necessitating implementation or that the requirements of Stage 1 are ineffective in complying with the necessary reduction.

3. Stage 3 Second Enforcement Stage of the Water Shortage Contingency Plan - A Stage 3 Water Shortage Contingency Plan Condition exists when it is determined that due to drought or other water supply conditions, a water supply shortage or threatened shortage exists and a further consumer demand reduction is necessary to make more efficient use of water and appropriately respond to existing water conditions. Stage 3 will be enacted upon a determination that water usage should be reduced further from current levels, that a temporary water emergency exists necessitating implementation or that the requirements in Stages 1 and 2 are ineffective in complying with the necessary reduction.

(Continued)

(C)

Schedule No. 14.1. - SD (Continued)

SUPPLEMENT

WATER SHORTAGE CONTINGENCY PLAN
SAN DIEGO DISTRICT

(C)

C. STAGES Cont'd

4. Stage 4 Third Enforcement Stage of the Water Shortage Contingency Plan - A Stage 4 Water Shortage Contingency Plan condition is also referred to as an "Emergency" condition. A Stage 4 condition exists when it is determined that a critical water shortage emergency exists, or that the measures in Stages 1 through 3 are ineffective in complying with a necessary reduction.

5. Stage 5 Mandatory Rationing. A rationing plan will be implemented when it is determined that the efforts in Stage 4 are insufficient to meet the regulatory or physical limitations of the available water supply.

D. WATER USE VIOLATION FINE

1. When an Enforcement Stage of the Water Shortage Contingency Plan has been activated by Commission authorization, the water use restrictions of Stage 1 in the Water Shortage Contingency Plan in Section D of Rule 14.1 become subject to fines and penalties imposed by the utility. The utility will first work closely with local law enforcement and public agencies charged with enforcing the mandatory water use restrictions. However, should the utility find that the local agency is not effectively enforcing the mandatory use restrictions, the utility, after written warnings, such as door hangers and letters, may begin to issue fines...? If a customer is seen violating the water use restrictions, as outlined in Rule No. 14.1 and the Special Conditions below, the customer will be subject to the following fine structure:

    a. First offense: Written warning, including explanation of penalty for subsequent offense.

    b. Second offense within 1 year (of the same restriction): Written warning, including explanation of penalty for subsequent offense and $100 fine.

    c. Third offense within 1 year (of the same restriction): Written warning, including explanation of penalty for subsequent offense and a $250 fine.

    d. Fourth offense within 1 year (of the same restriction): Written warning, including explanation of penalty for subsequent offense and a $500 fine.

    e. Fifth offense within 1 year (of the same restriction): Written warning, including explanation of penalty for subsequent offense and service termination pursuant to Rule 11 and a $500 fine.

    f. Sixth offense within 1 year. (of the same restriction): Installation of a flow restricting device on customer's water meter for duration of enforcement stage of the Water Contingency Plan.

2. Offenses for separate water use restrictions will each start at the warning stage.

3. The water use violation fine is in addition to the regular rate schedule charges and any applicable drought surcharge rates.

(C)

(Continued)

Schedule No. 14.1. - SD (Continued)

SUPPLEMENT WATER SHORTAGE CONTINGENCY PLAN
SAN DIEGO DISTRICT

(C)

E. APPLICABLE DROUGHT SURCHARGE RATES

1. When in Stage 3 of the Water Shortage Contingency Plan - a surcharge rate be will be added to all residential water usage in excess of 8 CCF. The surcharge rate will be equal to the Tier 3 residential rate in effect at the time Stage 3 is enacted. The surcharge rate for low income customers will be 50% of the Stage 3 surcharge rate. For all other customers there will be no surcharge imposed at Stage 3.

2. When in Stage 4 of the Water Shortage Contingency Plan – The Stage 3 residential drought surcharge rates will be tripled for all usage in excess of 8 CCF in Stage 4. The surcharge rate for low income customers will be 50% of the residential Stage 4 surcharge rate. All other customers will pay a drought surcharge rate of 25% of the regular rate on all usage in Stage 4.

3. Rule 14.1 includes provisions to allow customers to seek a variance to the drought surcharge rates. Those residential customers who prevail in their request for a variance will receive a 50% increase in the amount of usage not subject to the surcharge rate. The usage not subject to the surcharge rate would be increased from 8 CCF to 12 CCF.

F. ENFORCEMENT

1. Letter/Fine: From second violation of the same restriction within a one year period and onwards, a violation letter will be posted on property and sent to billing address, if different.

2. Aging of violation: Violations will accrue for the period of one year and be considered corrected and expunged one year after the violation occurs. The purpose of this rule is to prevent discrete violations from accruing in the event of a multi-year enforcement of the Water Contingency Plan.

(Continued)

(C)

Schedule No. 14.1. - SD (Continued)

SUPPLEMENT WATER SHORTAGE CONTINGENCY PLAN
SAN DIEGO DISTRICT

(C)

3. Applies to all Enforcement Stages of Water Shortage Contingency Plan.

	Violation 1	Violation 2 (of the same restriction)	Violation 3 (of the same restriction)	Violation 4 (of the same restriction)	Violation 5/6 [2] (of the same restriction)
Proof of violation	Employee or Customer reports, with no additional verification required	Verification with a written report by employee or contractor of CAW	Verification with a written report by employee or contractor of CAW	Verification with a written report by employee or contractor of CAW	Verification with a written report by employee or contractor of CAW
Letter/fine	Warning letter mailed to premise and billing address	Violation letter posted and mailed with $100 penalty on next bill	Violation letter posted and mailed with $250 penalty on next bill	Violation letter posted and mailed with $500 penalty on next bill	Violation letter posted and mailed, shut off per Rule 11 and $500 penalty on next bill
Fixing leaks **Stage 1** **Stage 2** **Stage 3** **Stage 4**	Customer has: 5 days 72 hours 24 hours Immediate	Customer has: 5 days 72 hours 24 hours Immediate	Customer has: 5 days 72 hours 24 hours Immediate	Customer has: 5 days 72 hours 24 hours Immediate	Customer has: 5 days 72 hours 24 hours Immediate
Time to correct violation	5 days	5 days	5 days	5 days	5 days
Time customer has to request variance of the alleged violation	14 days to contact CAW in writing	14 days to contact CAW in writing	10 days to file an appeal with CAW in writing	10 days to file an appeal with CAW in writing	10 days to file an appeal with CAW in writing
If the customer does not agree with CAW's resolution [1] **Reference Section K of Rule 14.1**	Further reported violations of the same restricted use will not be counted in the determination of further action until one week after the variance request is resolved	If the customer disagrees with CAW's resolution, they may file a formal complaint with the CPUC	If the customer disagrees with CAW's resolution, they may file a formal complaint with the CPUC	If the customer disagrees with CAW's resolution, they may file a formal complaint with the CPUC	If the customer disagrees with CAW's resolution, they may file a formal complaint with the CPUC

[1] If a customer has appealed the receipt of the penalty, the penalty will continue to be posted on the customer's account, but will not result in further service action, until at least 14 days after the resolution of appeals. Once resolved, if in the customers favor, the penalty will be immediately removed from the account. If not resolved in the customers favor, then the penalty will be due and payable as part of the next billing cycle and subject to all such further actions as with any other billed charge.

[2] For violation 6 instead of shut-off per Rule 11 and $500 penalty, a flow restrictor will be installed for duration of enforcement.

(C)

(Continued)

Schedule No. 14.1. - SD (Continued)
WATER SHORTAGE CONTINGENCY PLAN
SAN DIEGO DISTRICT

SUPPLEMENT

(C)

G. FLOW RESTRICTOR REMOVAL CHARGE

The charge for removal of a flow-restricting device and/or reconnecting water service shall be:

Connection Size	Removal Charges
5/8" to 1"	$150.00
1-1/2" to 2"	$200
3" and larger	Actual Cost

H. SPECIAL CONDITIONS

1. The Tier 2 advice letter requesting activation of any Enforcement Stage of Schedule 14.1 shall include documentation of the overall water shortage justifying activation of that particular stage.

2. This tariff schedule shall remain in effect until the utility files a Tier 1 advice letter to deactivate specific stage of Water Shortage Contingency Plan and such is authorized by the Commission.

3. Water use violation fines must be separately identified on each bill.

4. Water penalty surcharges must be separately identified on each bill.

5. All bills are subject to the reimbursement fee set forth on Schedule No. UF.

6. All monies collected by the utility through drought surcharges or penalties or fees for water use violations shall be booked to the Water Revenue Adjustment Mechanism (WRAM) or a memorandum account to offset recovery of lost revenues. All flow restrictor removal charges collected by the utility and all expenses incurred by the utility to implement Rule 14.1 and Schedule 14.1, and the requirements of the California State Water Board Resources Control Board ("SWRCB"), or other agencies, that have not been considered in a General Rate Case or other proceeding, shall be tracked in a memorandum account for disposition as directed or authorized from time to time by the Commission and shall be recoverable by the utility if determined to be reasonable by the Commission.

(C)

APPENDIX C. PUBLIC HEARING NOTICE

The San Diego Union-Tribune

PROOF of Publication

Bill To:
BNA Communications - CU00270673
PO Box 632940
San Diego,CA 92163

STATE OF ILLINOIS
COUNTY OF Cook

Proof of Publication of

See Attached

The Undersigned, declares under penalty of perjury under the laws of the State of California: That he/she is and at all times herein mentioned was a citizen of the United States, over the age of twenty-one years, and that he/she is not a party to, nor interested in the above entitled matter; that he/she is Chief Clerk for the publisher of

San Diego Union-Tribune

a newspaper of general circulation, printed and published daily in the City of San Diego, County of San Diego, and which newspaper is published for the dissemination of local news and intelligence of a general character, and which newspaper at all the times herein mentioned had and still has a bona fide subscription list of paying subscribers, and which newspaper has been established, printed and published at regular intervals in the said City of San Diego, County of San Diego, for a period exceeding one year next preceding the date of publication of the notice hereinafter referred to, and which newspaper is not devoted to nor published for the interests, entertainment or instruction of a particular class, profession, trade, calling, race, or denomination, or any number of same; that the notice of which the annexed is a printed copy, has been published in said newspaper in accordance with the instruction of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

June 10, 2016

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated in the City of Chicago, State of Illinois
on this 10th of June 2016.

Erin Julian
San Diego Union-Tribune
Legal Advertising

4244665

The San Diego Union-Tribune

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San Diego,CA 92163

NOTICE OF PUBLIC HEARING
On California American Water's Urban Water Management Plan

California American Water will hold a public hearing on Friday, June 24, 2016 on the final draft of the 2015 Urban Water Management Plan for its San Diego County District service area. This service area includes the cities of Coronado, Imperial Beach, a section of the City of San Diego, and a small portion of Chula Vista. Copies of the plan will be available for public review, and public comment will be accepted. The hearing will be held at 9:00 a.m. at the California American Water office located at 1025 Palm Avenue, Imperial Beach, CA 91932.

4244665

APPENDIX D. DWR REVIEW CHECKLIST

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	Section 2.0
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	Section 2.1
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Plan Preparation	Section 2.5.2	Section 2.2
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 3.1
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 3.2
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Section 3.3
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 3.4
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 3.3
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 4.2
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	Section 4.2.3

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Section 4.2.1
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	Section 4.1/Appendix A
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the basis for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5 and App E	Appendix A
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply is the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Appendix A
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	Section 4.1
1608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	Not applicable
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	Not Applicable
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	Section 4.1/Appendix A
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	Section 5.1
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 5.2
10631(b)(1)	Indicate whether a groundwater management plan has been adopted by the water supplier or if there is any other specific	System Supplies	Section 6.2.2	Section 6.2.1

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
	authorization for groundwater management. Include a copy of the plan or authorization.			
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Section 5.2
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Section 6.2
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	Section 6.2.1
10631(b)(3)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.4	Section 5.2
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	Section 6.2.1
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.7	Section 5.4
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	Section 5.7
10631(i)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 5.5
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	Not applicable

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	Section 5.6
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	Section 5.6.1
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2.2	Section 5.6.1
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Section 5.6.2
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	Section 5.6.3
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4	Section 5.6.3
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5	Section 5.6.3
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Section 5.6.3

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	Section 6.1.3
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Section 6.1
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Section 6.1.2
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	Section 6.1
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	Section 6.1.1/6.3
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Section 6.1.2
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	Section 6.2
10632(a)(2)	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three- year historic sequence for the agency.	Water Shortage Contingency Planning	Section 8.9	Section 6.2.3
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	Section 6.2.4
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Section 6.2.2

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Section 6.2.2/ Appendix B
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Section 8.1.3
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	Section 6.3.5
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Section 6.3.8
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	Section 6.3.6
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	Section 7.1
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	Not applicable
10631(j)	CUWCC members may submit their 2013- 2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	Appendix C
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	Section 2.2

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Section 2.2
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Section 2.2
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Section 2.2
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Section 2.2
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	Section 2.1
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Section 2.2
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	Section 2.2
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Section 2.2
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Section 2.2
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will	Plan Adoption, Submittal, and Implementation	Section 10.5	Section 2.2

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
	make the plan available for public review during normal business hours.			
No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 2.2
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 2.2
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Section 0
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Sections 3.2 and 3.3
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 3.3; Table 3-4
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 3.3; Table 3-4
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 3.3
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per	10608.20(e)		Section 4.1; Appendix A

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
	capita water use, along with the bases for determining those estimates, including references to supporting data.			
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 2.2; Appendix C

APPENDIX E. DEMAND PROJECTION METHODOLOGY

Demand projections were developed by applying the following methodology:

1. **Calculate SB7 Baseline and Targets.** WSC calculated the baseline, compliance, interim target, and target per capita water use for the San Diego County District in compliance with SB7 requirements. The Per Capita Water Use Technical Memorandum describes how these per capita numbers were calculated (see Appendix A).
2. **Estimate population growth rates for each service area.** WSC calculated population projections and annual growth rates for the service area based on SANDAG's Series 13: 2050 Regional Growth Forecast projections (4):
    a. SANDAG provided a database of population projections up to 2050 in Geographical Information Systems (GIS) shapefile format. The population projections years were 2012, 2020, 2035, and 2050. The database assigns population projections to each unique Transportation Analysis Zones (TAZs). California American Water's service area overlies approximately 109 TAZs. The TAZs were intersected with California American Water's service area boundaries using GIS.
    b. The next step involved calculating the population per area for each TAZ and calculating the amount of acres in each TAZ that were overlapped by the California American Water service area boundary. The TAZ population per area factor calculated for each TAZ was applied to the amount of area in each TAZ overlapped by a California American Water service area.
    c. Then, the projections for the District were interpolated to provide a population projection for every year between 2016 and 2035.
    d. Lastly, an annual growth rate was calculated for each year for the District.
3. **Estimate 2010 population.** The population estimates for California American Water's service areas were calculated using DWR's online Population Tool, which utilizes GIS service area boundaries, service connection data and Census data. The DWR Population Tool overlaps GIS shapefiles with Census populations by Census block for 1990, 2000 and 2010. The calculated population of each block within California American Water's service area is summed up to provide populations for 1990, 2000, and 2010. Populations are divided by the total service connections in each respective census year to come up with a persons per connection factor for the purposes of projecting populations from 2010-2015. Linear interpolation was used to determine the population for years in between the census years.
4. **Develop population projections through 2030.** WSC applied the growth rates calculated in step 2 to the 2015 population to calculate annual population estimates through 2035 for the District.
5. **Develop total demand projections.** WSC applied the Target gpcd to the projected population in 2020-2035 to estimate District total demand. The gpcd from 2016-2019 was interpolated based on 2015 and 2020 gpcd. The Target gpcd for the District was calculated to meet SB 7 compliance. Table E-1 shows the current and projected gpcd for the San Diego County District.

Table E-1. Actual and Projected GPCD for the San Diego County District

	Actual GPCD	Actual GPCD	Projected GPCD			
	2010	2015	2015	2020	2025	2030
San Diego County District	105	89	118	116	116	116

6. **Apportion total demand to DWR customer categories.** WSC established the amount of connections per type of use and the associated deliveries per type of use in 2010 and 2015 based on California American Water records (2010 & 2015 customer database and 2010 & 2015 Operating Report). The number of connections per type of use for 2016-2035 was estimated by applying the annual population growth rates. The volume of water deliveries by connection type for 2016-2035 was calculated by multiplying the 2015 volume of water deliveries for each connection type by the total District percentage increase or decrease in water deliveries for each year calculated based on gpcd. This essentially distributes the allowed increase or required decrease in water usage among connection types based on 2015 demand by connection type.

APPENDIX F. ADOPTION RESOLUTION

CALIFORNIA
AMERICAN WATER

June 30, 2015

Attention: Coordinator, Urban Water Management Plans
Department of Water Resources
Statewide Integrated Water Management
Water Use and Efficiency Branch
901 P Street
Sacramento, CA 95814

Subject: Adoption of California American Water's Southern Division San Diego County District 2015 Urban Water Management Plan

To Whom It May Concern,

This letter shall confirm that California-American Water Company ("California American Water") has adopted its 2015 Urban Water Management Plan for the Southern Division San Diego County District. The Urban Water Management Planning Act ("Act"), codified in California Water Code Sections 10610 through 10656, requires an urban water supplier, such as California American Water, to prepare and adopt an urban water management plan ("UWMP"). In accordance with the Act, California American Water is proud to submit its 2015 UWMP to the California Department of Water Resources ("DWR") for review.

Sincerely,

Deana L. Donohue, PE
Vice President–Engineering
California American Water

APPENDIX G. 60 DAY NOTIFICATION LETTERS

CALIFORNIA
AMERICAN WATER

April 13, 2016

City of Chula Vista
Gary Halbert, City Manager
276 Fourth Avenue
Chula Vista, CA 91910

Subject: California American Water San Diego County District 2015 Urban Water Management Plan

Dear Mr. Halbert,

California American Water is in the process of preparing its San Diego County District 2015 Urban Water Management Plan (UWMP) as required by the Urban Water Management Planning Act (Act). The Act requires California American Water to notify cities and counties within its service areas that it is preparing its 2015 UWMP 60 days prior to holding a public hearing thereby encouraging public involvement and agency coordination. California American Water will notify you of the specific date, time, and location of this public hearing when finalized.

This letter serves as your official notice of preparation and intent to adopt the UWMP. A draft of the UWMP will be available for review in May 2016. Until that time, if you have any questions or comments regarding the San Diego County District UWMP please contact Water Systems Consulting, Inc., the consultant responsible for the preparation of the UWMP at:

Water Systems Consulting, Inc.
Attn. Spencer Waterman, Staff Planner
3765 South Higuera St. Suite 102
San Luis Obispo, California 93401
(805) 457-8833 ext. 102
(805) 441-6158
swaterman@wsc-inc.com

Sincerely,

Mark Reifer

Mark Reifer
Operations Engineer
California American Water

CALIFORNIA
AMERICAN WATER

April 13, 2016

City of San Diego
Scott Chadwick, Chief Operating Officer
202 C St., 11th Floor
San Diego, CA 92101

Subject: California American Water San Diego County District 2015 Urban Water Management Plan

Dear Mr. Chadwick,

California American Water is in the process of preparing its San Diego County District 2015 Urban Water Management Plan (UWMP) as required by the Urban Water Management Planning Act (Act). The Act requires California American Water to notify cities and counties within its service areas that it is preparing its 2015 UWMP 60 days prior to holding a public hearing thereby encouraging public involvement and agency coordination. California American Water will notify you of the specific date, time, and location of this public hearing when finalized.

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Water Systems Consulting, Inc.
Attn. Spencer Waterman, Staff Planner
3765 South Higuera St. Suite 102
San Luis Obispo, California 93401
(805) 457-8833 ext. 102
(805) 441-6158
swaterman@wsc-inc.com

Sincerely,

Mark Reifer

Mark Reifer
Operations Engineer
California American Water

CALIFORNIA
AMERICAN WATER

April 13, 2016

City of Coronado
Andy Hall, City Manager
1825 Strand Way
Coronado, CA 92118

Subject: California American Water San Diego County District 2015 Urban Water Management Plan

Dear Mr. Hall,

California American Water is in the process of preparing its San Diego County District 2015 Urban Water Management Plan (UWMP) as required by the Urban Water Management Planning Act (Act). The Act requires California American Water to notify cities and counties within its service areas that it is preparing its 2015 UWMP 60 days prior to holding a public hearing thereby encouraging public involvement and agency coordination. California American Water will notify you of the specific date, time, and location of this public hearing when finalized.

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Water Systems Consulting, Inc.
Attn. Spencer Waterman, Staff Planner
3765 South Higuera St. Suite 102
San Luis Obispo, California 93401
(805) 457-8833 ext. 102
(805) 441-6158
swaterman@wsc-inc.com

Sincerely,

Mark Reifer

Mark Reifer
Operations Engineer
California American Water

CALIFORNIA
AMERICAN WATER

April 13, 2016

County of San Diego
Helen Robbins-Meyer, Chief Administrative Officer
1600 Pacific Highway, Room 209
San Diego, CA 92101

Subject: California American Water San Diego County District 2015 Urban Water Management Plan

Dear Ms. Robbins-Meyer,

California American Water is in the process of preparing its San Diego County District 2015 Urban Water Management Plan (UWMP) as required by the Urban Water Management Planning Act (Act). The Act requires California American Water to notify cities and counties within its service areas that it is preparing its 2015 UWMP 60 days prior to holding a public hearing thereby encouraging public involvement and agency coordination. California American Water will notify you of the specific date, time, and location of this public hearing when finalized.

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San Luis Obispo, California 93401
(805) 457-8833 ext. 102
(805) 441-6158
swaterman@wsc-inc.com

Sincerely,

Mark Reifer

Mark Reifer
Operations Engineer
California American Water

CALIFORNIA
AMERICAN WATER

April 13, 2016

City of Imperial Beach
Gary Brown, City Manager
825 Imperial Beach Blvd.
Imperial Beach, CA 91932

Subject: California American Water San Diego County District 2015 Urban Water Management Plan

Dear Mr. Brown,

California American Water is in the process of preparing its San Diego County District 2015 Urban Water Management Plan (UWMP) as required by the Urban Water Management Planning Act (Act). The Act requires California American Water to notify cities and counties within its service areas that it is preparing its 2015 UWMP 60 days prior to holding a public hearing thereby encouraging public involvement and agency coordination. California American Water will notify you of the specific date, time, and location of this public hearing when finalized.

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San Luis Obispo, California 93401
(805) 457-8833 ext. 102
(805) 441-6158
swaterman@wsc-inc.com

Sincerely,

Mark Reifer

Mark Reifer
Operations Engineer
California American Water

APPENDIX H. CLIMATE CHANGE CHECKLIST

Climate Change Vulnerability Assessment

The Climate Change Vulnerability Assessment is taken from the Climate Change Handbook for Regional Water Planning, USEPA and DWR, 2011. The vulnerability assessment highlights those water-related resources that are important to a region and are sensitive to climate change.

I. Water Demand

☐ *Are there major industries that require cooling/process water in your planning region?*

As average temperatures increase, cooling water needs may also increase. The San Diego District does not have any industrial water demand in their service area.

☑ *Does water use vary by more than 50% seasonally in parts of your region?*

Seasonal water use, which is primarily outdoor water use, is expected to increase as average temperatures increase and droughts become more frequent. The summer and winter water demands in this area vary by more than 25%, and irrigation water varies by over 50% from summer to winter.

☐ *Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?*

The San Diego District does not have any agricultural water demand.

☐ *Do groundwater supplies in your region lack resiliency after drought events?*

Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts and may become more dependent on groundwater pumping. The San Diego District purchases all of its supply from the City of San Diego, of which groundwater is less than 1% of its water supply portfolio.

☑ *Are water use curtailment measures effective in your region?*

Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts. California is currently experiencing the worst drought in its history and the San Diego District, along with all water suppliers in the state, have curtailment measures in effect.

☐ *Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?*

Changes in snowmelt patterns in the future may make it difficult to balance water demands. Vulnerabilities for ecosystems and municipal/agricultural water needs may be exacerbated by instream flow requirements that are: not quantified, not accurate for ecosystem needs under

multiple environmental conditions including droughts, and not met by regional water managers. The San Diego District does not contain any surface waters with instream flow requirements.

II. Water Supply

☑ *Does a portion of the water supply in your region come from snowmelt?*

Snowmelt is expected to decrease as the climate warms. Water systems supplied by snowmelt are therefore potentially vulnerable to climate change. The San Diego District purchases all of their water from The City of San Diego, with supplies from the State Water Project, Colorado River, and local runoff/reserves. The State Water Project is the only source that relies on snowmelt, and as the climate warms less State Water Project water may be available.

☑ *Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?*

The San Diego District purchases all of their water from The City of San Diego, with supplies from the State Water Project, Colorado River Aqueduct, and local runoff/reserves. The State Water project diverts water from the Delta and the Colorado River Aqueduct diverts from the Colorado River. These climate sensitive areas may be more vulnerable to climate change, and as the climate warms less water may be available for diversion.

☐ *Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?*

Coastal aquifers are susceptible to salt intrusion as sea levels rise, and many have already observed salt intrusion due to over-extraction, such as the West Coast Basin in southern California. The San Diego District does not rely on local groundwater sources and purchases all supplies from The City of San Diego.

☑ *Would your region have difficulty in storing carryover supply surpluses from year to year?*

Droughts are expected to become more severe in the future. Systems that can store more water may be more resilient to droughts. The San Diego District would have difficulty storing surplus supplies because they do not have a local reservoir or potential for groundwater storage.

☐ *Has your region faced a drought in the past during which it failed to meet local water demands?*

Droughts are expected to become more severe in the future. Systems that have already come close to their supply thresholds may be especially vulnerable to droughts in the future. The San Diego District has been able to meet demand throughout the last five years of the California drought.

☐ *Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?*

As invasive species are expected to become more prevalent with climate change, existing invasive species issues may indicate an ecological vulnerability to climate change. Most all waterways, along the Pacific coast and in lakes and rivers, in California have invasive species. There is an entire statewide California aquatic invasive species management plan to mitigate this since invasive species affect all of California. The District does not have specific invasive management issues at its facilities.

III. Water Quality

☐ *Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?*

Some areas are expected to become more vulnerable to wildfires over time. The California Public Interest Energy Research (PIER) Program has posted wildfire susceptibility projections as a Google Earth application, and according to this study the San Diego District does not have an increase in wildfire threat in the next 50 years.

☐ *Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?*

Warming temperatures will result in lower dissolved oxygen levels in water bodies, which are exacerbated by algal blooms and in turn enhance eutrophication. This does not apply directly to the San Diego District since it purchases its supplies; however, the City of San Diego does utilize surface water sources. The City of San Diego's Draft UWMP identified "several water bodies [that] are 303(d) listed for water quality issues related to eutrophication including Lake Hodges, Famosa Slough, Mission Bay at the mouths of Rose Creek and Tecolote Creek, lower San Diego River, and the Tijuana River."

☐ *Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?*

In the future, low flow conditions are expected to be more extreme and last longer. This may result in higher pollutant concentrations where loadings increase or remain constant. This does not apply because the San Diego District does not rely on surface water sources for supply; however, the District could be impacted by changes to the City of San Diego's surface supplies.

☐ *Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?*

In the future, flows are expected decrease, and to last longer. This may result in higher pollutant concentrations where loadings increase or remain constant. This does not apply because the San Diego District does not rely on surface water sources for supply; however, the District could be impacted by changes to the City of San Diego's surface supplies.

☐ *Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?*

While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to increased erosion, which will increase turbidity in surface waters. Areas that already observe water quality responses to rainstorm intensity may be especially vulnerable. This does not apply because the San Diego District does not rely on surface water sources for supply and all water is treated prior to being purchased from the City of San Diego.

IV. Sea Level Rise

☑ *Has coastal erosion already been observed in your region?*

Coastal erosion is expected to occur over the next century as sea levels rise. The San Diego District is located along the Pacific Coast and coastal erosion has been observed in this region.

☐ *Are there coastal structures, such as levees or breakwaters, in your region?*

Coastal structures designed for a specific mean sea level may be impacted by sea level rise. There are coastal structures called riprap on private property to protect homes from ocean rise and waves, but no formal coastal levees or breakwaters in the southernmost part of San Diego where the District is located.

☑*Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?*

Coastal flooding will become more common, and will impact a greater extent of property, as sea levels rise. Critical infrastructure in the coastal floodplain may be at risk. There are many low-lying areas that include residential homes in the District's service area that are less than six feet above mean sea level.

☑ *Are there climate-sensitive low-lying coastal habitats in your region?*

Low-lying coastal habitats that are particularly vulnerable to climate change include estuaries and coastal wetlands that rely on a delicate balance of freshwater and salt water. The San Diego District service area encompasses a large coastal area, including part of the Tijuana estuary, that is sensitive to climate change.

☑ *Are there areas in your region that currently flood during extreme high tides or storm surges?*

Areas that are already experiencing flooding during storm surges and very high tides, are more likely to experience increased flooding as sea levels rise. Some locations in the San Diego District service area with very low elevation are at risk of flooding during high tides and have potential for increased risk with sea level rises. Currently the community has taken precautions to prevent coastal flooding including installing rip rap on their coastal property, but should prepare for increased severity of coastal storms.

☐ *Is there land subsidence in the coastal areas of your region?*

Land subsidence may compound the impacts of sea level rise. There has been no observed land subsidence in the San Diego District service area.

☑ *Do tidal gauges along the coastal parts of your region show an increase over the past several decades?*

Local sea level rise may be higher or lower than state, national, or continental projections. NOAA tide and currents data show in San Diego there is an average sea level rise of 2.13 mm/year, which is slightly above the global average of 1.6-1.7 mm/year.

V. Flooding

☑ *Does critical infrastructure in your region lie within the 200-year floodplain?*

While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to higher peak flows and more severe floods. A FEMA 200-year flood map was not available, but a 100-year flood map shows there is significant infrastructure, including part of the I-5 freeway, inside the 100-year floodplain.

☐ *Does part of your region lie within the Sacramento-San Joaquin Drainage District?*

No part of the San Diego District lies within the Sacramento-San Joaquin Drainage District.

☐ *Does aging critical flood protection infrastructure exist in your region?*

There is no critical flood protection infrastructure in the San Diego's service area.

☐ *Have flood control facilities (such as impoundment structures) been insufficient in the past?*

The San Diego District is not located near any major flood control facilities such as impoundments.

☐ *Are wildfires a concern in parts of your region?*

Some areas are expected to become more vulnerable to wildfires over time. The California Public Interest Energy Research (PIER)Program has posted wildfire susceptibility projections as a Google Earth application, and according to this study the San Diego District does not have an increase in wildfire threat in the next 50 years.

VI. Ecosystem and Habitat Vulnerability

☑*Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?*

Erosion is expected to increase with climate change, and sedimentation is expected to shift. Habitats sensitive to these events may be particularly vulnerable to climate change. The San Diego District is along the southern San Diego coast and contains coastal habitats vulnerable to erosion and part of the Tijuana Estuary vulnerable to sedimentation.

☑*Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?*

Seasonal high and low flows, are already shifting in many locations. The San Diego District includes part of the Tijuana estuary, which has always had variable freshwater flows, including some years with no fresh water flows. This is expected to increase in the future with climate change.

☑ *Do climate-sensitive fauna or flora populations live in your region?*

Some specific species are more sensitive to climate variations than others. In California, over 3,000 native plant species are expected to face reductions in hospitable geographic range. The San Diego District is highly urbanized already, but contains some habitat for climate sensitive flora and fauna, including coastal species.

☑ *Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?*

Species that are already threatened or endangered may have a lowered capacity to adapt to climate change. The San Diego District is highly urbanized but contains habitat for many threatened or endangered species including the Quino Checkerspot butterfly, the California Gnatcher, the fairy shrimp, the Ambrosia plant, the button-celery plant, the Mesa-mint plant, and Thornmint plant.

☑*Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?*

The San Diego region relies heavily on coastal habitats, including the beaches and the estuary, for recreation and economic activities.

☐ *Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?*

The San Diego District does not contain any surface waters and only contains a small portion of the Tijuana estuary which has variable fresh water inflows already.

☑ *Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?*

Storm surges are expected to result in greater damage in the future due to sea level rise. This makes fragile coastal ecosystems vulnerable. The San Diego District does contain part of the Tijuana Estuary, but the rest of the District is urbanized.

☐*Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change?*

The San Diego District does is not included in any of these habitats.

☑*Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?*

These ecosystems are particularly vulnerable to climate change. The District may contain fragmented wildlife habitats because the area is highly urbanized.

VII. Hydropower

☑ *Is hydropower a source of electricity in your region?*

As seasonal river flows shift, hydropower is expected to become less reliable in the future. California generated 6% of its electricity from hydropower in 2014, and San Diego Gas and Electric Company generated less than 1% from hydropower in 2014.

☐ *Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?*

Energy needs are expected to increase in many locations as the climate warms. This increase in electricity demand may compound decreases in hydropower production, increasing its priority for a region. All places in California, including San Diego, expect an increase in energy in the future due to climate change and population growth. The role of hydropower in meeting future demand in the San Diego region is uncertain. According to the City of San Diego's Draft 2015 UWMP, "hydropower was recently created at Lake Hodges/Olivenhain Reservoir, and an additional project is possible at the San Vicente Dam."

Urban Water Supplier: *CAW-San Diego County District*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Retail Potable Deliveries

Table O-1B: Voluntary Energy Intensity - Total Utility Approach

Enter Start Date for Reporting Period	1/1/2015	Urban Water Supplier Operational Control		
End Date	12/31/2015	Sum of All Water Management Processes	Non-Consequential Hydropower	
		Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (AF)		*9298*	*0*	*9298*
Energy Consumed (kWh)		*2913*	*0*	*2913*
Energy Intensity (kWh/AF)		*0.3*	*0.0*	*0.3*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

Data Quality Narrative:

All data was metered and supplied by California American Water.

Narrative:

The CAW San Diego District purchases 100% of its water from the City of San Diego. This analysis does not include embedded energy that was added to the water upstream of the District, and only energy the District used for water distribution. This includes energy at the interconnection with The City of San Diego supply and energy used at a single storage tank, but not the energy used at the District office. The energy intensity calculation shows the District only uses 0.3 kWh of electricity per AF of water it supplies, a relatively low value compared to other water suppliers that extract, treat, and pump local supplies. This is because the water supplied has already been extracted, treated, and is pressurized and ready for distribution.